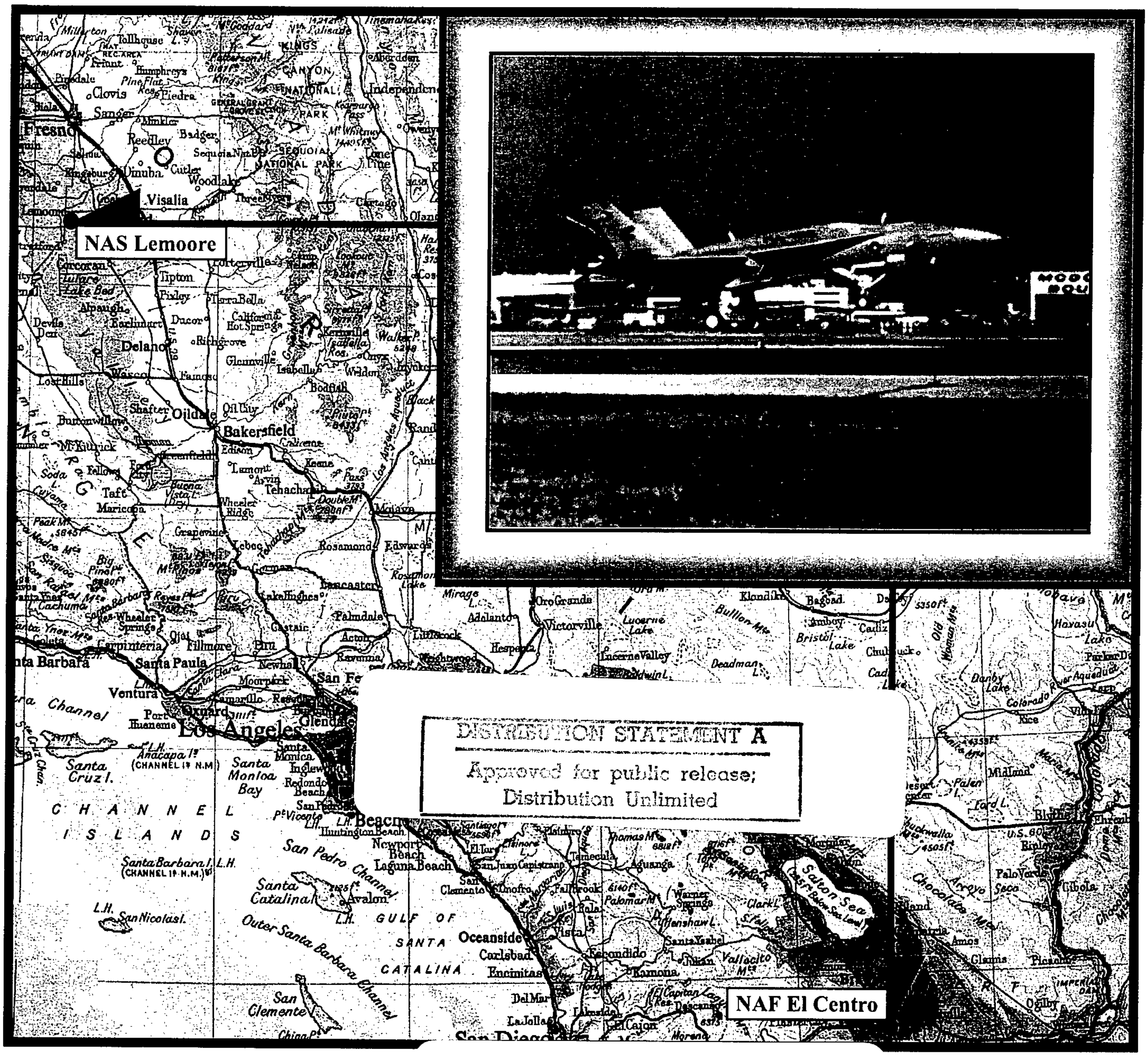
Final Environmental Impact Statement for Development of Facilities to Support Basing US Pacific Fleet F/A-18E/F Aircraft on the West Coast of the United States

Volume II



DISTRIBUTION STATEMENT A

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May 1998

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Department of the Navy
F/A-18E/F Fleet Introduction Team

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Final Environmental Impact Statement for Development of Facilities to Support Basing US Pacific Fleet F/A-18E/F Aircraft on the West Coast of the United States

Volume II
Technical Appendices

U.S. Navy
Engineering Field Activity West
900 Commodore Drive
San Bruno, California 94066

May 1998

Final Environmental Impact Statement for Development of Facilities to Support Basing US Pacific Fleet F/A-18E/F Aircraft on the West Coast of The United States

Volume II
Technical Appendices

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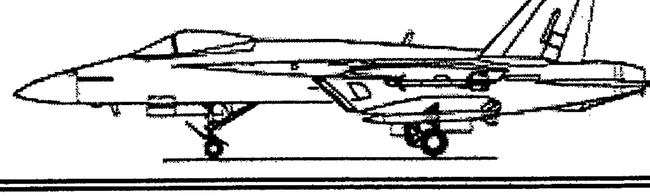

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APPENDIX A
PUBLIC INVOLVEMENT

A.1 OVERVIEW

As discussed in Section 1.5, Public Involvement Process of this document, the NEPA process is designed to involve the public in the decision-making process. This appendix contains copies of the public involvement materials used to inform federal, state, and local agencies, elected officials, organizations, and individuals about the preparation of this document.

A.2 SUMMARY OF SCOPING PROCESS

A scoping letter and project summary was distributed to announce the Navy's intent to prepare this EIS, the start of the public scoping period, the dates and locations of the public scoping meetings, and the address and deadline to provide scoping comments. A notice of intent (NOI) was published in the Federal Register on April 7, 1997 (Volume 62, Number 66). A copy of the NOI is provided in this appendix. The NOI was published in four local newspapers, the Hanford Sentinel, Fresno Bee, Imperial Valley Press, and Oxnard Star. A sample newspaper advertisement and the dates of publication are provided in this appendix.

Written and oral comments received during the EIS scoping process are summarized below for the three proposed alternative sites. Oral comments were received at the three scoping meetings held in the City of Lemoore on April 28, 1997, the City of El Centro on April 29, 1997, and the City of Camarillo of April 30, 1997. The scoping process ended May 23, 1997. A Summary of the issues identified through the scoping process is provided below.

NAS Lemoore (Location of scoping meeting: City of Lemoore)

Some of the comment letters were expressing support for or opposition to the proposed action at NAS Lemoore. Specific areas of concern related to the environmental impact statement included biological resources, land use and airspace, noise, public health and safety, and the general NEPA processes.

NAF El Centro (Location of scoping meeting: City of El Centro)

Some of the comment letters expressed support for or opposition to the proposed action at NAF El Centro. Specific areas of concern related to the environmental impact statement included biological resources and noise.

A.3 SUMMARY OF DRAFT EIS COMMENT PROCESS

A Notice of Availability (NOA) of the Draft EIS announcing the availability of the Draft EIS and specifying the start of the public comment period, the dates and locations of the public hearings on the Draft EIS, and the address and deadline to provide comments was published in the Federal Register on December 12, 1997 (Volume 62, Number 239). A copy of the NOA is provided in this appendix. The NOA was published in three local newspapers, the Hanford Sentinel, Fresno Bee, and Imperial Valley Press. A sample newspaper advertisement and the dates of publication are provided in this appendix.

The Navy held public hearings on January 7, 1998, in Lemoore, California, and on January 8, 1998, in El Centro, California, to provide the public and concerned parties with an opportunity to comment on the content and accuracy of the draft EIS. Seventy-two written comments were also received on the Draft EIS during the comment period. The Final EIS responds to and incorporates comments received on the Draft EIS.

A.4 SUMMARY OF FINAL EIS COMMENT PROCESS

The NOA for the Final EIS was published in the Federal Register and in public notices and press releases. As required by NEPA, there will be a 30-day no action review period after the NOA for the Final EIS is published. During this period, the public may comment on the adequacy of responses to comments and the Final EIS. After that time, the Navy will prepare a record of decision (ROD) detailing the decisions on project approval.

[Federal Register: April 7, 1997 (Volume 62, Number 66)]
[Notices]
[Page 16563-16564]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr07ap97_dat-47]

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement for the Proposed West Coast Introduction of the F/A-18 E/F Aircraft

SUMMARY: Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the West Coast introduction of F/A-18 E/F aircraft, associated functional and administrative components, and associated military personnel. Naval Air Station (NAS) Lemoore, Naval Air Weapons Station (NAWS) Pt. Mugu, and Naval Air Facility (NAF) El Centro, California are proposed as potential basing locations.

This process involves retiring older aircraft from active use and incorporating the new F/A-18 E/F into service. The new aircraft will continue to support operations of the U.S. Pacific Fleet.

Major environmental issues addressed in the EIS will include, but are not limited to, air space, operational training capability, socioeconomic and environmental justice impacts, air quality, noise, endangered species, cultural resources, traffic, local infrastructure impacts, and cumulative impacts.

ADDRESSES: The Navy will initiate a scoping process for the purpose of determining the scope of issues to be addressed and for identifying the significant issues related to this action. The Navy will hold public scoping meetings on Monday, April 28, 1997 at 7 p.m. at the Lemoore High School Cafeteria, 101 East Bush Street, Lemoore, California; on Tuesday, April 29, 1997 at 7 p.m. at the Imperial County Board of Supervisors Office, 940 West Main Street, El Centro, California; and on Wednesday, April 30, 1997 at 7 p.m. in the Bougainvillea Room, Orchid Professional Building, 816 Camarillo Springs Road, Camarillo, California. A brief presentation will precede a request for public comments. Navy representatives will be available at this meeting to receive comments from the public regarding information on issues of concern. It is important that federal, state, and local agencies and interested individuals take this opportunity to provide information or identify environmental concerns that should be addressed during the preparation of the EIS. In the interest of available time, each speaker will be asked to limit oral comments to five minutes.

Agencies and the public are also invited and encouraged to provide written comments in addition to, or in lieu of, oral comments at the public meeting. To be most helpful, scoping comments should clearly describe specific issues or topics which the commenter believes the EIS should address.

FOR FURTHER INFORMATION CONTACT:
Written statements and/or questions regarding the scoping process

should be mailed to: Commanding Officer, Engineering Field Activity West, Naval Facilities Engineering Command, 900 Commodore Drive, San Bruno, CA 94066-5006 (Attention: Mr. Surinder Sikand, Code 18511), telephone (415) 244-3020, fax (415) 244-3737. All

[[Page 16564]]

comments must be received no later than May 23, 1997.

Dated: April 1, 1997.
D.E. Koenig,
LCDR, JAGC, USN, Federal Register Liaison Officer.
[FR Doc. 97-8720 Filed 4-4-97; 8:45 am]
BILLING CODE 3810-FF-M

5090.1B
1851SU/EP-1254
11 April 1997

SUBJECT: Notice of Scoping of Public Concerns Regarding an Environmental Impact Statement (EIS) for the Proposed West Coast Basing of the F/A-18 E/F Aircraft and Associated Fleet Readiness and Fleet Operational Squadrons

Dear Interested Party,

This letter is to notify you of a public meeting to identify environmental issues that should be considered regarding the assignment of 92 F/A-18 E/F aircraft and 1550 personnel to a West Coast Navy installation. Naval Air Station (NAS) Lemoore, California, Naval Air Weapons Station (NAWS) Point Mugu, California, and Naval Air Facility (NAF) El Centro, California, have been identified as potential basing locations. Additional operational, training, maintenance, storage, administrative, housing, community, and utility facilities will be required to support the basing. A summary of the project and installation characteristics is included as an attachment to this letter.

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy is preparing an environmental impact statement (EIS) to identify and evaluate any potential individual and cumulative effects of the proposed action. The EIS proposed action is the basing of the aircraft, related facilities, and personnel at a West Coast Navy installation. The EIS will evaluate project impacts at the three identified installations at an equal level of detail and include a No Action Alternative as required by NEPA. The Navy will use the EIS in its consideration of options for basing the F/A-18 aircraft and personnel. The EIS is intended to provide decisionmakers, responsible agencies, and the public with adequate information on potential significant environmental impacts to make informed choices about Navy actions.

As a starting point in the EIS process, the Navy is conducting public scoping, pursuant to Section 102(2)(c) of NEPA as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508). The Navy has scheduled a public meeting at each of the installations under consideration to receive the F/A-18 E/F aircraft. At each meeting, Navy representatives will be available to receive comments from the public regarding environmental issues of concern. A brief presentation will precede a request for public comment. In the interest of time, speakers will be asked to limit their oral comments to five minutes. Comment forms also will be available to submit written comments at these meetings. The schedule for these meetings is as follows:

DATE: April 28, 1997
LOCATION: Lemoore High School Cafeteria, 101 East Bush Street
Lemoore California
TIME: 7:00 p.m.

DATE: April 29, 1997
LOCATION: Imperial County Board of Supervisors Office, 940 West Main Street
El Centro, California
TIME: 7:00 p.m.

DATE: April 30, 1997
LOCATION: Orchid Professional Building Bougainvillea Room, 816 Camarillo Springs Road
Camarillo, California
TIME: 7:00 p.m.

In addition to attending the meetings, the public is encouraged to express their concerns regarding the proposed action or EIS by sending letters, faxes, or email to the following address:

Commanding Officer
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-5006
Attn: Mr. Surinder Sikand, Code 18511

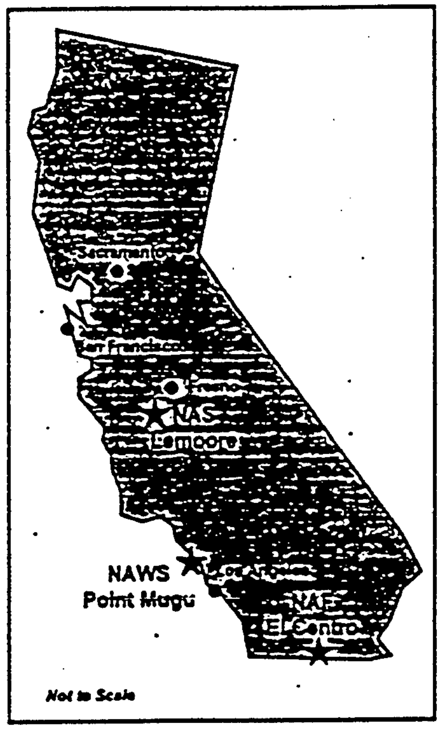
Email: sssikand@efawest.navfac.navy.mil
Fax: 415-244-3737

Affected federal, state and local agencies, and other interested groups and individuals are also invited to submit written comments to the above address. Comments must be received by May 23, 1997, to be incorporated into the scoping process. Unless you note otherwise, you will be added to the mailing list to receive future information on this EIS upon response to this scoping request. Thank you for your participation in our public involvement and scoping process.

John H. Kennedy
Head, Environmental Planning Branch
Sam Dennis
Program Manager, Environmental Planning Branch

Proposed West Coast Basing of the F/A-18 E/F Aircraft and Associated Fleet Readiness and Fleet Operational Squadrons Project Description

Introduction



The proposed project includes basing new F/A-18 E/F aircraft and personnel and expanding facilities to maintain aircraft and personnel and provide the associated training functions. Installations under consideration include Naval Air Station (NAS) Lemoore, Naval Air Facility (NAF) El Centro, and Naval Air Weapons Station (NAWS) Point Mugu. Approximately 92 aircraft and 1550 personnel would be based at the receiving installation, necessitating facilities for aircraft operations, training, aircraft maintenance, administration, housing, community activities, and utilities. In addition to the increased staffing and equipment levels, the project would increase Navy activity and change flight operations at the receiving installation.

Project Components

F/A-18 E/F Aircraft

The 92 new F/A-18 E/F aircraft are designed to replace older aircraft currently operating in the Navy fleet from both land bases and aircraft carriers throughout the world. Many of the aircraft based on the West Coast are among those that require replacement. These aircraft need to remain on the West Coast to provide for a balance in the force structure and to be near aircraft carriers stationed on the West Coast.

Personnel

Approximately 1550 personnel, consisting of military and civilian staff, would be associated with the aircraft assignment. These personnel would operate, test, maintain, and repair the aircraft and aircraft components and perform administrative functions related to the F/A-18 program.

Facilities

Facilities would be required to house, maintain, and repair aircraft; test aircraft components; store ordnance; house additional personnel; and serve as administrative space for new programs. The installation facilities also must be capable of absorbing the additional flight operations and the training schedules of the fleet squadrons.

Operational/Training Requirements

Some key features required for operation of the F/A-18 E/F aircraft include airspace for field carrier practice patterns, dual parallel runways, and nearby training ranges. Data for existing F/A-18 operations indicate that approximately 140,000 additional operations would be generated each year under the proposed action. This includes field carrier landing practice, 90 percent of which must be conducted at the basing installation.

Potential Receiving Installations

NAS Lemoore

NAS Lemoore contains 18,784 acres of Navy-owned land and 11,039 acres of easements in the Central San Joaquin Valley, California. The 29,823-acre base is situated approximately 80 miles inland from the Pacific Ocean and halfway between Los Angeles and Sacramento. The closest large urban center is Fresno, located approximately 35 miles to the northeast.

Currently, the NAS Lemoore airfield supports on average 100 flights per day and approximately 40,840 FCLP exercises annually. The base is home to 179 F/A-18 A, B, C, and D aircraft and an overall workforce of 6,831 people comprised of 5,026 military and 1,805 civilian personnel. Training exercises are conducted in the NAS Lemoore airspace, other ranges in California and Nevada, and the air/sea training ranges off the California coast.

Basing 92 aircraft at NAS Lemoore would require some new facilities and upgrades to existing facilities. Many of the required facilities are available at NAS Lemoore necessitating primarily renovation or adaptation for the F/A-18 E/F aircraft. Housing at NAS Lemoore is currently near capacity; therefore, construction of some housing could be required for new personnel.

NAF El Centro

NAF El Centro is located in California's Imperial Valley, approximately 120 miles east of San Diego and the Pacific Ocean. The city of El Centro, the county seat of Imperial County, is approximately 7 miles east of the installation. The facility is located approximately 12 miles north of the US-Mexico border. The installation occupies approximately 2,327 acres, a portion of which is leased out under an agricultural lease-out program.

The airfield contains four runways, which support nearby target practice exercises. There are three weapons ranges in the vicinity of NAF El Centro: Chocolate Mountains Gunnery Range, Target 103A Parachute Drop Area, and Targets 68 and 85. NAF El Centro is home to the fixed wing aircraft belonging to the CNATRA Strike Detachment and Strike Fighter Wing Pacific Detachment. Several transient units use NAF El Centro facilities during winter training periods, including the Navy's Flight Demonstration Squadron, the Blue Angels.

Basing 92 aircraft at NAF El Centro would require construction of several new facilities and upgrades to existing facilities. Many of the facilities available at NAF El Centro would require extensive upgrades for the F/A-18 E/F aircraft. The runways at El Centro would require reconfiguration to accommodate the F/A-18 E/F aircraft. Since housing at NAF El Centro is also currently near capacity, construction of some housing could be required for new personnel.

NAWS Point Mugu

NAWS Point Mugu is located in southern Ventura County, approximately 7 miles southeast of Oxnard, California. The installation occupies approximately 4,575 acres, along the coast of the Pacific Ocean.

The airfield at NAWS Point Mugu supports approximately 110 flights per day and 240 FCLP exercises annually. The base has an overall workforce of approximately 7,800 personnel, including approximately 4,400 military personnel and 3,400 civilian contractors.

Basing 92 aircraft at NAWS Point Mugu would require several new facilities and upgrades to existing facilities. Many of the facilities available at NAWS Point Mugu would require extensive upgrades for the F/A-18 aircraft. Since housing at NAWS Point Mugu is also currently near capacity, construction of some housing could be required for new personnel. The incoming squadrons would train in nearby ranges. Aircraft would perform FCLP training at an outlying field, such as San Clemente Island or San Nicolas Island.

NEWSPAPER ADVERTISEMENT

The newspaper advertisement on the following page announced the preparation of the West Coast Basing of the F/A-18E/F Aircraft EIS, and the start of the public scoping process. The advertisement was published in the following papers

The Imperial Valley Press – Monday, April 28, 1997 and Tuesday, April 29, 1997.
The Fresno Bee - Monday, April 28, 1997 and Tuesday, April 29, 1997.
The Hanford Sentinel - Monday, April 28, 1997 and Tuesday, April 29, 1997.
The Oxnard Star- Monday, April 28, 1997 and Tuesday, April 29, 1997.

Imperial Valley Press — Monday, April 23, 1997

NOTICE OF INTENT

Department of the Navy

Intent to Prepare an Environmental Impact Statement For the Proposed West Coast Introduction of the F/A-18 E/F Aircraft and Associated Fleet Readiness and Fleet Operational Squadrons

Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the West Coast assignment of F/A-18 E/F aircraft. Homeporting Fleet Replacement Squadrons, four Fleet Squadrons, and associated military personnel, and constructing and upgrading utilities and facilities, such as operations, training, maintenance, administrative, housing, and community facilities, are being evaluated. Naval Air Station (NAS) Lemoore, California, Naval Air Weapons Station (NAWS) Point Mugu, California, and Naval Air Facility (NAF) El Centro, California, will be evaluated as potential homeporting locations. At this point, NAS Lemoore has been identified as the Preferred Alternative. However, all sites will receive equal consideration in the evaluation.

This process involves retiring older aircraft from Navy use and incorporating new F/A-18 E/F aircraft into service. Many of the aircraft based on the West Coast are among those that require replacement. For operational reasons, these aircraft need to remain on the West Coast to provide a balance in the force structure and to be near aircraft carriers stationed on the West Coast.

Aircraft training operations at the three shore activities are being evaluated for potential expansion as a result of this proposed action. Evaluation of potentially significant issues, such as adequacy of air space, clean air conformity analyses, impacts on local infrastructure, and noise analysis, may be necessary depending upon coordination with other federal, state, and local agencies. Findings from other detailed studies conducted during the EIS process also will be incorporated.

Additional airspace analyses are being conducted to identify alternative scenarios for the increased aircraft operations. Impacts associated with the additional aircraft, facilities, and personnel, along with any other proposed federal actions in the region around NAS Lemoore, NAWS Point Mugu, and NAF El Centro, will be considered in the cumulative analysis. Major environmental issues addressed in the EIS will include, but are not limited to, air space, operational training capability, socioeconomic and environmental justice factors, air quality, noise, endangered species, cultural resources, traffic, and local infrastructure.

The Navy will initiate a scoping process for the purpose of determining the scope of issues to be addressed and for identifying the significant issues related to this action. The Navy will hold public scoping meetings on:

April 28, 1997 at 7:00 p.m. Lemoore High School Cafeteria 101 East Bush Street Lemoore, California	April 29, 1997 at 7:00 p.m. Imperial County Board of Supervisors Office 940 West Main Street El Centro, California	April 30, 1997 at 7:00 p.m. Orchid Professional Building Bougainvillea Room 816 Camarillo Springs Road Camarillo, California

A brief presentation will preceed a request for public comment. Navy representatives will be available at this meeting to receive comments from the public regarding information on issues of concern to the public. It is important that federal, state, and local agencies and interested individuals take this opportunity to provide information or identify environmental concerns that should be addressed during the preparation of the EIS. In the interest of the available time, each speaker will be asked to limit his or her oral comments to five minutes. Comment forms also will be available to submit written comments at these meetings.

Agencies and the public also are invited and encouraged to provide written comments in addition to, or in lieu of, oral comments at the public meeting. To be most helpful, scoping comments should clearly describe specific information, data, issues, or topics that the commentator believes the EIS should address. Written statements and or questions regarding the scoping process must be received no later than May 23, 1997, and should be mailed to:

Commanding Officer
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-5006
Attn: Mr. Surinder Sikand, Code 18511
Telephone: 415 244 3020
FAX: 415 244 3737
Email: sssikand@efawest.navfac.navy.mil

Paid Advertisement

[Federal Register: December 12, 1997 (Volume 62, Number 239)]
[Notices]
[Page 65426]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr12de97-56]

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ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-5487-2]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564-7167 OR (202) 564-7153.
Weekly receipt of Environmental Impact Statements
Filed December 01, 1997 Through December 05, 1997 Pursuant to 40 CFR 1506.9.
EIS No. 970464, Draft EIS, COE, AZ, Rio Salado Environmental Restoration of two Sites along the Salt River: (1) Phoenix Reach and (2) Tempe Reach, Feasibility Report, in the Cities of Phoenix and Tempe, Maricopa County, AZ, Due: January 26, 1998, Contact: Alex Watt (213) 452-4204.
EIS No. 970465, Revised Draft EIS, AFS, CA, Rock Creek Recreational Trails Management Plan, Implementation, Additional Information, Eldorado National Forest, Georgetown Ranger Director, Eldorado County, CA, Due: January 26, 1998, Contact: Linda Earley (916) 333-4312.
EIS No. 970466, Final EIS, AFS, AK, Helicopter Landings within Wilderness, Implementation, Tongass National Forest, Chatham, Stikine and Ketchikan Area, AK, Due: January 12, 1998, Contact: Larry Roberts (907) 772-3841.
EIS No. 970467, Draft EIS, NPS, OR, Crater Lake National Park, Implementation of New Concession Contract for Visitor Services Plan, OR, Due: January 26, 1998, Contact: Al Kendricks (541) 594-2211.
EIS No. 970468, Draft Supplement, APH, Logs, Lumber and Other Unmanufactured Wood Articles Importation, Additional Updated Information, Improvements to the existing system to Prohibit Introduction of Plant Pests into the United States, Due: February 10, 1998, Contact: Jack Edmundson (301) 734-8565.
EIS No. 970469, Draft EIS, USN, CA, US Pacific Fleet F/A 18 E/F Aircraft for Development of Facilities to Support Basing on the West Coast of the United States, Possible Site Installations are (1) Lemoore Naval Air Station and (2) El Centro Naval Air Facility, Fresno, King and Imperial Counties, CA, Due: January 26, 1998, Contact: Surinder Sikand (415) 244-3020.

Dated: December 9, 1997.
William D. Dickerson,
Director, NEPA Compliance Division, Office of Federal Activities.
[FR Doc. 97-32567 Filed 12-11-97; 8:45 am]
BILLING CODE 6560-50-P

NEWSPAPER ADVERTISEMENTS

The newspaper advertisement on the following page announced the availability of the West Coast Basin of the F/A-18E/F Aircraft Draft EIS, and the start of the public comment period. The advertisement was published in the following papers:

The Imperial Valley Press - Sunday, December 21, 1998 and Monday, December 22, 1998
The Fresno Bee - Sunday, December 21, 1998 and Monday, December 22, 1998
The Hartford Sentinel - Sunday, December 21, 1998 and Monday, December 22, 1998

Sunday, December 21, 1997 Imperial Valley Press

Notice of Availability
Department of the Navy
Notice of Availability of Draft Environmental Impact Statement For the Proposed Development of Facilities to Support Basing US Pacific Fleet F/A-18E/F Aircraft on the West Coast of the United States

A Draft Environmental Impact Statement (DEIS) has been prepared to analyz potential Impacts to the human and natural environment from the proposed actic to develop facilities to support the West Coast basing of the Navy's new F/A-18E/ aircraft. This DEIS has been prepared in accordance with the Nation: Environmental Policy Act (NEPA) of 1969 as amended, the Council o Environmental Quality (CEQ) implementing regulations (Title 40 Code of Feder: Regulations [CFR] Parts 1500-1508), and the U.S. Navy Environmental an Natural Resources Program Manual OPNAVINST 5090.1B.

The proposed action includes sitting 164 F/A-18E/F aircraft, locating associate military personnel and family members, and providing associated training function at the receiving installation. The two installations considered for the West Coas base are Naval Air Station (NAS) Lemoore and Naval Air Facility (NAF) El Centrc NAS Lemoore is the preferred alternative evaluated in this EIS.

For NAS Lemoore, where F/A-18C/D strike fighter squadrons are currently basec the proposed action would result in an increase of 92 aircraft because 72 of th 164 aircraft would replace existing F/A-18 aircraft. Basing the aircraft at NAF E Centro, which does not have existing strike fighter squadrons, would result in ar increase of 164 aircraft at the installation.

The DEIS analyzes potential environmental impacts to land use and airspace visual resources, socioeconomics, cultural resources, traffic and circulation, ai quality, noise, biological resources, water resources, utilities and services, publi health and safety, and hazardous materials and waste. Potentially significant bu mitigable environmental impacts include impacts to land use and airspace and bio logical resources at NAF El Centro, schools (socioeconomics) at NAS Lemoore and traffic, air quality, and hazardous materials and waste at both installations Significant and not mitigable impacts to noise have been identified at NAF E Centro.

Announcement of the availability of the DEIS was published in the December 12 1997 Federal Register. The Navy will hold public hearing meetings on:

Wednesday, January 7, 1998 at 7 P.M.	Thursday, January 8, 1998 at 7 P.M.
Lemoore City Council Chambers	Imperial County Board of Supervisors Chambers
429 C Street	940 West Main Street
Lemoore, California	El Centro, California

You are invited to provide written comments on the DEIS describing specific issues or topics and mail to:

Commanding Officer, Engineering Field Activity (EFA) West
900 Commodore Drive
San Bruno, CA 94066-5006
Attention: Mr. Surinder Sikand, Code 70311
Telephone: (650) 244-3020
Fax: (650) 244-3206
E-mail: sssikand@efawest.navfac.navy.mil
All comments must be received by January 26, 1998

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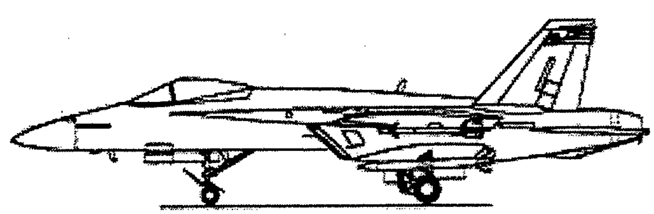

APPENDIX B
SOCIOECONOMICS

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	EIF MODEL RESULTS FOR NAF EL CENTRO	B-29

APPENDIX B
SOCIOECONOMICS

B.1 OVERVIEW

The assessment of socioeconomic impacts resulting from Navy actions can be one of the most controversial issues related to the realignment, closure or modification of an installation. The economic and social well-being of a community can be dependent upon the activities of the installation, and disruptions to the status quo become politically charged and emotion-laden. The objective of a socioeconomic analysis of Navy actions is an open, realistic, and documented assessment of the potential effects.

The requirement to assess socioeconomic impacts in EAs or EISs has been a source of legal discussion since the passage of the National Environmental Policy Act (NEPA). While NEPA is predominately oriented toward the biophysical environment, court decisions have supported the need for analysis of socioeconomic impacts when they are accompanied by biophysical impacts.

Economic Impact Forecast System (EIFS)

The US Army developed the Economic Impact Forecast System (EIFS) with the assistance of many academic and professional economists and regional scientists to address economic impacts and to measure their significance. As a result of its applicability and in the interest of uniformity, EIFS is mandated by ASA (IL&E) for use in NEPA assessment for base realignments and closure. The entire system is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in EIFS are simple and easy to understand but still have firm, defensible bases in regional economic theory.

EIFS is included as one of the tools of the Environmental Technical Information System (ETIS) and is implemented as an on-line service supported by USACERL through the University of Illinois. The system is available to anyone with an approved login and password and is available at all times through toll-free numbers,

Telnet, and other commonly-used communications. The ETIS Support Center at the university and the staff of USACERL are available to assist with the use of EIFS.

The data bases in EIFS are national in scope and cover the approximately 3,700 counties, parishes and independent cities recognized by federal agencies as reporting units. EIFS allows the user to define an economic region of influence (ROI) by simply identifying the counties that are to be analyzed. Once the ROI is defined, the system aggregates the data, calculates multipliers and other variables used in the various models in EIFS, and prompts the user for input data.

The EIFS Impact Models

The basis of the EIFS analytical capabilities is the calculation of multipliers that are used to estimate the impacts resulting from Navy-related changes in local expenditures and/or employment. In calculating the multipliers, EIFS uses the economic base model approach that relies on the ratio of total economic activity to basic economic activity. Basic, in this context, is defined as the production or employment to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating aggregate impacts and makes the economic base model ideal for the EA/EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its basic sector for example, a dollar increase in local expenditures due to an expansion of its military installation. EIFS estimates its multipliers using a location quotient approach based on the concentration of industries within the region relative to the concentration of industries in the nation.

EIFS has models for three basic military activity scenarios: standard, construction, and training. The user selects a model to be used and inputs those data elements into the selected model that describe the Army action: civilian and military to be moved and their salaries and the local procurement associated with the activity being relocated. Once these are entered into the system, a projection of changes in the local economy is provided. These are projected changes in sales volume, employment, income, and population. These four indicator variables are used to measure and evaluate socioeconomic impacts.

The Evaluation of Socioeconomic Impacts

Under NEPA, there are no established thresholds in determining whether a socioeconomic impact is significant or not. Once model projections are obtained, the Rational Threshold Value (RTV) profile allows the reader to evaluate the context and intensity of the impacts. This analytical tool reviews the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, employment, income, and population. These evaluations indicate the intensity of the positive and negative changes of a project.

The RTV provides boundaries (threshold values) to assess the magnitude of an action's impacts. The largest historical change (both increase and decrease) maps out the boundaries. These values provide a basis for comparing an action's impact to the historical fluctuation in a particular area. Therefore, the assignment of thresholds is made on an individual basis. Specifically, EIFS sets the boundaries by multiplying the maximum historical deviation of:

		Increase	Decrease
Business volume	x	100%	75%
Personal income	x	100%	67%
Total employment	x	100%	67%
Total population	x	100%	50%

The percentage allowances are arbitrary but sensible. The maximum positive historical fluctuation is expressed with expansion because of the positive connotations of economic growth. While cases of damaging economic growth have been cited and although the zero-growth concept is being accepted by many local planning groups, the effects of reductions and closures generally are much more controversial than expansions.

The major strengths of the RTV criteria is that it is specific to the region under analysis and it is based on actual historical time series data for the defined region. The use of EIFS impact models in combination with the RTV has proven very successful in addressing perceived socioeconomic impacts. The EIFS model and the RTV technique for measuring significance are theoretically sound and have been reviewed on numerous occasions.

The severity of conceivable impacts accelerates in the following order: total business volume, total personal income, total employment, and total population. Business volume impacts may be alleviated by manipulation of such variables as inventory and new equipment. Impacts on workers or proprietors are not easily or immediately assessed. Changes in employment and income are of primary interest. Employment and income impacts are followed by changes in personal income, directly affecting individuals within the region. Population threshold indicators are extremely important because they reflect the effects on local government revenues, housing, education, infrastructure, and other social services. They should be weighted accordingly.

The following pages contain the EIFS input and output data for the proposed realignment action. This data forms the basis for the socioeconomic impact analysis presented in Section 4.4.

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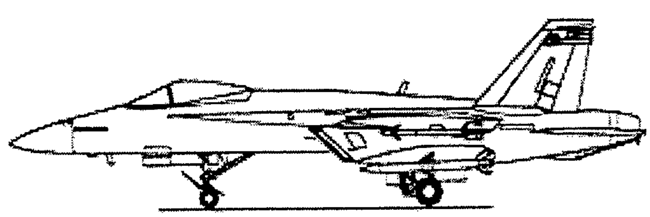

EIFS Model Results for NAS Lemoore

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

POPULATION

YEAR	Population	change	deviation	%deviation
1969	473,900			
1970	481,500	7,600	-7,143	-1.507 %
1971	491,200	9,700	-5,043	-1.047 %
1972	500,100	8,900	-5,843	-1.190 %
1973	508,200	8,100	-6,643	-1.328 %
1974	519,000	10,800	-3,943	-0.776 %
1975	534,800	15,800	1,057	0.204 %
1976	548,900	14,100	-643	-0.120 %
1977	561,500	12,600	-2,143	-0.391 %
1978	571,200	9,700	-5,043	-0.898 %
1979	579,900	8,700	-6,043	-1.058 %
1980	591,500	11,600	-3,143	-0.542 %
1981	606,100	14,600	-143	-0.024 %
1982	622,100	16,000	1,257	0.207 %
1983	640,400	18,300	3,557	0.572 %
1984	659,100	18,700	3,957	0.618 %
1985	674,600	15,500	757	0.115 %
1986	686,600	12,000	-2,743	-0.407 %
1987	705,100	18,500	3,757	0.547 %
1988	730,500	25,400	10,657	1.511 %
1989	752,700	22,200	7,457	1.021 %
1990	773,700	21,000	6,257	0.831 %
1991	795,000	21,300	6,557	0.847 %
1992	813,000	18,000	3,257	0.410 %

average yearly change:	14,743
maximum historic positive deviation:	10,657
maximum historic negative deviation:	-7,143
maximum historic % positive deviation:	1.511 %
maximum historic % negative deviation:	-1.507 %
positive rtv:	1.511 %
negative rtv:	-0.754 %

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

EMPLOYMENT

YEAR	Employment	change	deviation	%deviation
1969	202,756			
1970	207,326	4,570	-3,482	-1.717 %
1971	213,273	5,947	-2,105	-1.015 %
1972	225,804	12,531	4,479	2.100 %
1973	235,285	9,481	1,429	0.633 %
1974	246,823	11,538	3,486	1.482 %
1975	253,391	6,568	-1,484	-0.601 %
1976	261,720	8,329	277	0.110 %
1977	270,839	9,119	1,067	0.408 %
1978	282,692	11,853	3,801	1.404 %
1979	301,522	18,830	10,778	3.813 %
1980	308,427	6,905	-1,147	-0.380 %
1981	311,674	3,247	-4,805	-1.558 %
1982	313,260	1,586	-6,466	-2.074 %
1983	321,133	7,873	-179	-0.057 %
1984	328,264	7,131	-921	-0.287 %
1985	331,832	3,568	-4,484	-1.366 %
1986	334,838	3,006	-5,046	-1.521 %
1987	346,463	11,625	3,573	1.067 %
1988	361,091	14,628	6,576	1.898 %
1989	372,667	11,576	3,524	0.976 %
1990	386,894	14,227	6,175	1.657 %
1991	389,311	2,417	-5,635	-1.456 %
1992	387,941	-1,370	-9,422	-2.420 %

average yearly change:	8,052
maximum historic positive deviation:	10,778
maximum historic negative deviation:	-9,422
maximum historic % positive deviation:	3.813 %
maximum historic % negative deviation:	-2.420 %
positive rtv:	3.813 %
negative rtv:	-1.621 %

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

BUSINESS VOLUME (using Non-Farm Income)

YEAR	Non-Farm income	adjusted income	change	deviation	%deviation
1969	1,117,431	3,306,009			
1970	1,205,517	3,367,366	61,357	-95,374	-2.885 %
1971	1,322,519	3,545,627	178,261	21,530	0.639 %
1972	1,486,422	3,850,834	305,207	148,476	4.188 %
1973	1,676,472	4,088,956	238,122	81,390	2.114 %
1974	1,880,283	4,132,490	43,534	-113,197	-2.768 %
1975	2,084,751	4,194,670	62,180	-94,552	-2.288 %
1976	2,354,448	4,484,663	289,993	133,261	3.177 %
1977	2,631,046	4,706,701	222,038	65,307	1.456 %
1978	3,008,945	4,998,247	291,546	134,815	2.864 %
1979	3,464,338	5,170,654	172,406	15,675	0.314 %
1980	3,777,357	4,963,676	-206,978	-363,710	-7.034 %
1981	4,052,859	4,830,583	-133,093	-289.824	-5.839 %
1982	4,197,224	4,721,287	-109,296	-266.027	-5.507 %
1983	4,511,902	4,925,657	204,371	47,639	1.009 %
1984	4,916,035	5,185,691	260,033	103.302	2.097 %
1985	5,215,622	5,316,638	130,947	-25,784	-0.497 %
1986	5,521,963	5,722,241	405,603	248,872	4.681 %
1987	6,033,555	6,033,555	311,314	154,582	2.701 %
1988	6,492,620	6,242,904	209,349	52,617	0.872 %
1989	7,112,777	6,525,483	282,580	125,848	2.016 %
1990	7,835,348	6,831,167	305,683	148,952	2.283 %
1991	8,212,027	6,877,744	46,578	-110,154	-1.613 %
1992	8,486,501	6,910,831	33,087	-123,645	-1.798 %

average yearly change:	156,731
maximum historic positive deviation:	248,872
maximum historic negative deviation:	-363,710
maximum historic % positive deviation:	4.681 %
maximum historic % negative deviation:	-7.034 %
positive rtv:	4.681 %
negative rtv:	-5.276 %

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

PERSONAL INCOME

YEAR	Personal income	adjusted income	change	deviation	%deviation
1969	1,668,472	4,936,308			
1970	1,834,571	5,124,500	188,192	-63,443	-1.285 %
1971	1,979,113	5,305,933	181,433	-70,203	-1.370 %
1972	2,223,148	5,759,451	453,518	201,882	3.805 %
1973	2,545,547	6,208,651	449,200	197,565	3.430 %
1974	3,040,132	6,681,609	472,958	221,322	3.565 %
1975	3,233,169	6,505,370	-176,239	-427.874	-6.404 %
1976	3,785,360	7,210,210	704,839	453.204	6.967 %
1977	4,005,609	7,165,669	-44,541	-296.176	-4.108 %
1978	4,399,184	7,307,615	141,946	-109,690	-1.531 %
1979	5,352,613	7,988,975	681,360	429,725	5.881 %
1980	6,265,749	8,233,573	244,598	-7,037	-0.088 %
1981	6,429,576	7,663,380	-570,193	-821.329	-9.981 %
1982	6,749,976	7,592,774	-70,606	-322,242	-4.205 %
1983	6,887,462	7,519,063	-73,710	-325,346	-4.285 %
1984	7,736,451	8,160,813	641,750	390,114	5.188 %
1985	8,292,046	8,452,646	291,833	40,198	0.493 %
1986	8,800,766	9,119,965	667,318	415,683	4.918 %
1987	9,642,581	9,642,581	522,616	270.981	2.971 %
1988	10,211,036	9,818,304	175,723	-75,913	-0.787 %
1989	11,163,668	10,241,897	423,593	171.958	1.751 %
1990	12,150,402	10,593,202	351,304	99,669	0.973 %
1991	12,457,405	10,433,337	-159,864	-411,500	-3.885 %
1992	13,168,980	10,723,925	290,587	38,952	0.373 %

average yearly change:	251,636
maximum historic positive deviation:	453,204
maximum historic negative deviation:	-821,329
maximum historic % positive deviation:	6.967 %
maximum historic % negative deviation:	-9.981 %
positive rtv:	6.967 %
negative rtv:	-6.688 %

STANDARD EIFS FORECAST MODEL

Project name: F/A-18 E/F at NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $107,500
Change in civilian employment: 120
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 0.0 percent
Change in military employment: 167
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAS Lemoore (1999)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$5,123,000	
Induced:	$8,085,000	
Total:	$13,208,000	(0.098%)
Employment .... Direct:	40	
Total:	389	(0.112%)
Income .... Direct:	$733,000	
Total (place of work):	$11,809,000	
Total (place of residence):	$11,700,000	(0.096%)
Local population ....:	416	(0.059%)
Local off-base population ....:	245	
Number of school children ....:	70	
Demand for housing .... Rental:	63	
Owner occupied:	35	
Government expenditures............:	$871,000	
Government revenues ....:	$1,373,000	
Net Government revenues ....:	$501,000	
Civilian employees expected to relocate:	0	
Military employees expected to relocate:	167	

STANDARD EIFS FORECAST MODEL

Project name: F/A-18 E/F at NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $107,500
Change in civilian employment: 120
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 0.0 percent
Change in military employment: 594
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAS Lemoore (2000)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$10,972,000	
Induced:	$17,318,000	
Total:	$28,290,000	(0.209%)
Employment .... Direct:	85	
Total:	933	(0.269%)
Income .... Direct:	$1,569,000	
Total (place of work):	$29,863,000	
Total (place of residence):	$29,617,000	(0.243%)
Local population ....:	1,479	(0.210%)
Local off-base population ....:	873	
Number of school children ....:	250	
Demand for housing .... Rental:	224	
Owner occupied:	126	
Government expenditures............:	$2,258,000	
Government revenues ....:	$3,888,000	
Net Government revenues ....:	$1,631,000	
Civilian employees expected to relocate:	0	
Military employees expected to relocate:	594	

STANDARD EIFS FORECAST MODEL

Project name: F/A-18 E/F at NAS Lemoore (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $107,500
Change in civilian employment: 120
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 0.0 percent
Change in military employment: 780
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAS Lemoore (2001)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$13,520,000	
Induced:	$21,339,000	
Total:	$34,860,000	(0.258%)
Employment .... Direct:	105	
Total:	1,170	(0.338%)
Income .... Direct:	$1,933,000	
Total (place of work):	$37,727,000	
Total (place of residence):	$37,422,000	(0.307%)
Local population ....:	1,942	(0.275%)
Local off-base population ....:	1,146	
Number of school children ....:	329	
Demand for housing .... Rental:	295	
Owner occupied:	166	
Government expenditures............:	$2,861,000	
Government revenues ....:	$4,984,000	
Net Government revenues ....:	$2,123,000	
Civilian employees expected to relocate:	0	
Military employees expected to relocate:	780	

STANDARD EIFS FORECAST MODEL

Project name: F/A-18 E/F at NAS Lemoore (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $107,500
Change in civilian employment: 120
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 0.0 percent
Change in military employment: 1,058
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAS Lemoore (2002)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$14,647,000	
Induced:	$23,117,000	
Total:	$37,763,000	(0.279%)
Employment .... Direct:	114	
Total:	1,353	(0.390%)
Income .... Direct:	$2,094,000	
Total (place of work):	$44,851,000	
Total (place of residence):	$44,511,000	(0.365%)
Local population ....:	2,634	(0.374%)
Local off-base population ....:	1,554	
Number of school children ....:	446	
Demand for housing .... Rental:	400	
Owner occupied:	225	
Government expenditures............:	$3,444,000	
Government revenues ....:	$6,243,000	
Net Government revenues ....:	$2,798,000	
Civilian employees expected to relocate:	0	
Military employees expected to relocate:	1,058	

STANDARD EIFS FORECAST MODEL

Project name: F/A-18 E/F at NAS Lemoore (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $107,500
Change in civilian employment: 120
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 0.0 percent
Change in military employment: 1,336
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAS Lemoore (2003)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$21,137,000	
	Induced:	$33,361,000	
	Total:	$54,498,000	(0.403%)
Employment	Direct:	164	
	Total:	1,879	(0.542%)
Income	Direct:	$3,022,000	
	Total (place of work):	$61,235,000	
	Total (place of residence):	$60,752,000	(0.499%)
Local population ....:		3,327	(0.472%)
Local off-base population ....:		1,963	
Number of school children ....:		564	
Demand for housing	Rental:	504	
	Owner occupied:	284	
Government expenditures............:		$4,666,000	
Government revenues ....:		$8,260,000	
Net Government revenues ....:		$3,593,000	
Civilian employees expected to relocate:		0	
Military employees expected to relocate:		1,336	

STANDARD EIFS FORECAST MODEL

Project name: F/A-18 E/F at NAS Lemoore (2004)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $107,500
Change in civilian employment: 120
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 0.0 percent
Change in military employment: 1,856
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAS Lemoore (2004)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$28,261,000	
	Induced:	$44,604,000	
	Total:	$72,864,000	(0.538%)
Employment	Direct:	219	
	Total:	2,541	(0.733%)
Income	Direct:	$4,041,000	
	Total (place of work):	$83,221,000	
	Total (place of residence):	$82,571,000	(0.678%)
Local population ....:		4,621	(0.655%)
Local off-base population ....:		2,727	
Number of school children ....:		783	
Demand for housing	Rental:	701	
	Owner occupied:	394	
Government expenditures............:		$6,355,000	
Government revenues ....:		$11,323,000	
Net Government revenues ....:		$4,968,000	
Civilian employees expected to relocate:		0	
Military employees expected to relocate:		1,856	

CONSTRUCTION

Project name: NAS Lemoore 1999

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $20,540,000
Local expenditures of project: 12,573,486.14 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS Lemoore 1999

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$10,725,000	
Induced:	$16,927,000	
Total:	$27,652,000	(0.200%)
Employment .... Direct:	81	
Total:	346	(0.100%)
Income .... Direct:	$1,501,000	
Total (place of work):	$8,465,000	
Total (place of residence):	$8,419,000	(0.069%)
Local population ....:	92	(0.013%)
Local off-base population ....:	92	
Number of school children ....:	16	
Demand for housing .... Rental:	41	
Owner occupied:	0	
Government expenditures............:	$815,000	
Government revenues ....:	$849,000	
Net Government revenues ....:	$34,000	
Civilian employees expected to relocate:	41	
Military employees expected to relocate:	0	

CONSTRUCTION

Project name: NAS Lemoore 2000

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $37,810,000
Local expenditures of project: 23,145,253.70 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS Lemoore 2000

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$19,742,000	
	Induced:	$31,159,000	
	Total:	$50,901,000	(0.368%)
Employment	Direct:	150	
	Total:	636	(0.184%)
Income	Direct:	$2,763,000	
	Total (place of work):	$15,583,000	
	Total (place of residence):	$15,498,000	(0.127%)
Local population ....:		170	(0.024%)
Local off-base population ....:		170	
Number of school children ....:		30	
Demand for housing	Rental:	75	
	Owner occupied:	0	
Government expenditures............:		$1,501,000	
Government revenues ....:		$1,563,000	
Net Government revenues ....:		$62,000	
Civilian employees expected to relocate:		75	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: NAS Lemoore 2001

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,000,000
Local expenditures of project: 31,219,464.13 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS Lemoore 2001

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$26,629,000	
Induced:	$42,029,000	
Total:	$68,658,000	(0.497%)
Employment .... Direct:	202	
Total:	858	(0.248%)
Income .... Direct:	$3,727,000	
Total (place of work):	$21,019,000	
Total (place of residence):	$20,905,000	(0.172%)
Local population ....:	229	(0.032%)
Local off-base population ....:	229	
Number of school children ....:	41	
Demand for housing .... Rental:	101	
Owner occupied:	0	
Government expenditures............:	$2,025,000	
Government revenues ....:	$2,109,000	
Net Government revenues ....:	$84,000	
Civilian employees expected to relocate:	101	
Military employees expected to relocate:	0	

CONSTRUCTION

Project name: NAS Lemoore 2002

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $28,150,000
Local expenditures of project: 17,231,919.90 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS Lemoore 2002

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$14,698,000	
Induced:	$23,198,000	
Total:	$37,896,000	(0.274%)
Employment .... Direct:	112	
Total:	474	(0.137%)
Income .... Direct:	$2,057,000	
Total (place of work):	$11,601,000	
Total (place of residence):	$11,539,000	(0.095%)
Local population ....:	126	(0.018%)
Local off-base population ....:	126	
Number of school children ....:	22	
Demand for housing .... Rental:	56	
Owner occupied:	0	
Government expenditures............:	$1,117,000	
Government revenues ....:	$1,164,000	
Net Government revenues ....:	$47,000	
Civilian employees expected to relocate:	56	
Military employees expected to relocate:	0	

CONSTRUCTION

Project name: NAS Lemoore 2003

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $24,802,000
Local expenditures of project: 15,182,453.91 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS Lemoore 2003

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$12,950,000	
Induced:	$20,439,000	
Total:	$33,389,000	(0.241%)
Employment .... Direct:	98	
Total:	417	(0.120%)
Income .... Direct:	$1,813,000	
Total (place of work):	$10,222,000	
Total (place of residence):	$10,166,000	(0.083%)
Local population ....:	111	(0.016%)
Local off-base population ....:	111	
Number of school children ....:	20	
Demand for housing .... Rental:	49	
Owner occupied:	0	
Government expenditures............:	$985,000	
Government revenues ....:	$1,026,000	
Net Government revenues ....:	$41,000	
Civilian employees expected to relocate:	49	
Military employees expected to relocate:	0	

```
STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name:   NAS Lemoore (1998)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
          local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $700,150
Change in civilian employment:  10
Average income of affected civilian personnel:  $30,861
Percent expected to relocate:  100%
Change in military employment:  237
Average income of affected military personnel:  $37,230
Percent of military living on the base:  33.0%


STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (1998)

Export income multiplier:                          2.5783
Change in local
  Sales volume ............... Direct:          $3,374,000
                              Induced:          $5,326,000
                                Total:          $8,700,000    (    0.064%)
  Employment ................. Direct:                  26
                                Total:                 314    (    0.091%)
  Income ..................... Direct:            $482,000
               Total (place of work):           $7,979,000
          Total (place of residence):           $7,910,000    (    0.065%)
  Local population ..................:                 619    (    0.088%)
  Local off-base population .........:                 424
  Number of school children .........:                 104
  Demand for housing ......... Rental:                 106
                       Owner occupied:                  63
  Government expenditures............:            $934,000
  Government revenues ...............:          $1,353,000
  Net Government revenues ...........:            $418,000
Civilian employees expected to relocate:                10
Military employees expected to relocate:               237
```

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $967,689
Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25%
Change in military employment: 1,115
Average income of affected military personnel: $37,230
Percent of military living on the base: 34.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (1999)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$20,443,000	
Induced:	$32,265,000	
Total:	$52,708,000	(0.389%)
Employment .... Direct:	159	
Total:	1,684	(0.486%)
Income .... Direct:	$2,923,000	
Total (place of work):	$53,986,000	
Total (place of residence):	$53,514,000	(0.439%)
Local population ....:	2,892	(0.410%)
Local off-base population ....:	1,948	
Number of school children ....:	486	
Demand for housing .... Rental:	489	
Owner occupied:	287	
Government expenditures............:	$4,687,000	
Government revenues ....:	$7,635,000	
Net Government revenues ....:	$2,948,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	1,115	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689
Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 1,542
Average income of affected military personnel: $37,230
Percent of military living on the base: 36.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2000)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$26,286,000	
Induced:	$41,486,000	
Total:	$67,772,000	(0.501%)
Employment .... Direct:	204	
Total:	2,228	(0.643%)
Income .... Direct:	$3,759,000	
Total (place of work):	$72,037,000	
Total (place of residence):	$71,429,000	(0.587%)
Local population ....:	3,955	(0.561%)
Local off-base population ....:	2,573	
Number of school children ....:	667	
Demand for housing .... Rental:	650	
Owner occupied:	377	
Government expenditures............:	$6,069,000	
Government revenues ....:	$10,147,000	
Net Government revenues ....:	$4,078,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	1,542	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689
Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 1,728
Average income of affected military personnel: $37,230
Percent of military living on the base: 41.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2001)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$28,274,000	
Induced:	$44,624,000	
Total:	$72,897,000	(0.539%)
Employment .... Direct:	219	
Total:	2,453	(0.708%)
Income .... Direct:	$4,043,000	
Total (place of work):	$79,695,000	
Total (place of residence):	$79,064,000	(0.649%)
Local population ....:	4,418	(0.627%)
Local off-base population ....:	2,654	
Number of school children ....:	745	
Demand for housing .... Rental:	671	
Owner occupied:	389	
Government expenditures............:	$6,294,000	
Government revenues ....:	$10,913,000	
Net Government revenues ....:	$4,619,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	1,728	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

```
Project name:   NAS Lemoore (2002)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $964,689
Change in civilian employment:  160
Average income of affected civilian personnel:  $30,861
Percent expected to relocate:  25.0%
Change in military employment:  2,006
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0%
```

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2002)

```
Export income multiplier:                            2.5783
Change in local
  Sales volume ............... Direct:         $32,082,000
                             Induced:          $50,635,000
                               Total:          $82,716,000    (   0.611%)
  Employment ................. Direct:                 249
                               Total:                2,808    (   0.810%)
  Income ..................... Direct:          $4,587,000
              Total (place of work):           $91,449,000
         Total (place of residence):           $90,729,000    (   0.745%)
  Local population ..................:               5,110    (   0.725%)
  Local off-base population .........:               3,062
  Number of school children .........:                 863
  Demand for housing ......... Rental:                 776
                       Owner occupied:                 448
  Government expenditures............:          $7,197,000
  Government revenues ...............:         $12,551,000
  Net Government revenues ...........:          $5,354,000
Civilian employees expected to relocate:                40
Military employees expected to relocate:             2,006
```

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689
Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 2,284
Average income of affected military personnel: $37,230
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2003)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$36,388,000	
Induced:	$57,431,000	
Total:	$93,819,000	(0.693%)
Employment .... Direct:	282	
Total:	3,172	(0.915%)
Income .... Direct:	$5,203,000	
Total (place of work):	$103,386,000	
Total (place of residence):	$102,545,000	(0.842%)
Local population ....:	5,803	(0.823%)
Local off-base population ....:	3,641	
Number of school children ....:	980	
Demand for housing .... Rental:	925	
Owner occupied:	531	
Government expenditures............:	$8,436,000	
Government revenues ....:	$14,481,000	
Net Government revenues ....:	$6,046,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	2,284	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2004)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689
Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 2,804
Average income of affected military personnel: $37,230
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2004)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$43,625,000	
Induced:	$68,853,000	
Total:	$112,478,000	(0.831%)
Employment .... Direct:	338	
Total:	3,836	(1.107%)
Income .... Direct:	$6,238,000	
Total (place of work):	$125,414,000	
Total (place of residence):	$124,399,000	(1.021%)
Local population ....:	7,097	(1.007%)
Local off-base population ....:	4,444	
Number of school children ....:	1,200	
Demand for housing .... Rental:	1,131	
Owner occupied:	647	
Government expenditures............:	$10,201,000	
Government revenues ....:	$17,611,000	
Net Government revenues ....:	$7,411,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	2,804	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $22,625,000
Local expenditures of project: $13,849,811.29 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (1998)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$11,813,000	
Induced:	$18,645,000	
Total:	$30,459,000	(0.220%)
Employment .... Direct:	90	
Total:	381	(0.110%)
Income .... Direct:	$1,653,000	
Total (place of work):	$9,324,000	
Total (place of residence):	$9,274,000	(0.076%)
Local population ....:	102	(0.014%)
Local off-base population ....:	102	
Number of school children ....:	18	
Demand for housing .... Rental:	45	
Owner occupied:	0	
Government expenditures............:	$898,000	
Government revenues ....:	$936,000	
Net Government revenues ....:	$37,000	
Civilian employees expected to relocate:	45	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,923,000
Local expenditures of project: $31,784,475.21 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (1999)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$27,111,000	
Induced:	$42,789,000	
Total:	$69,900,000	(0.506%)
Employment .... Direct:	206	
Total:	874	(0.252%)
Income .... Direct:	$3,795,000	
Total (place of work):	$21,399,000	
Total (place of residence):	$21,283,000	(0.175%)
Local population ....:	233	(0.033%)
Local off-base population ....:	233	
Number of school children ....:	41	
Demand for housing .... Rental:	103	
Owner occupied:	0	
Government expenditures............:	$2,061,000	
Government revenues ....:	$2,147,000	
Net Government revenues ....:	$86,000	
Civilian employees expected to relocate:	103	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $42,189,000
Local expenditures of project: $25,825,842.59 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2000)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$22,029,000	
Induced:	$34,768,000	
Total:	$56,796,000	(0.411%)
Employment .... Direct:	167	
Total:	710	(0.205%)
Income .... Direct:	$3,083,000	
Total (place of work):	$17,387,000	
Total (place of residence):	$17,293,000	(0.142%)
Local population ....:	189	(0.027%)
Local off-base population ....:	189	
Number of school children ....:	34	
Demand for housing .... Rental:	84	
Owner occupied:	0	
Government expenditures............:	$1,675,000	
Government revenues ....:	$1,744,000	
Net Government revenues ....:	$70,000	
Civilian employees expected to relocate:	84	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,000,000
Local expenditures of project: $31,219,464.13 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2001)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$26,629,000	
Induced:	$42,029,000	
Total:	$68,658,000	(0.497%)
Employment .... Direct:	202	
Total:	858	(0.248%)
Income .... Direct:	$3,727,000	
Total (place of work):	$21,019,000	
Total (place of residence):	$20,905,000	(0.172%)
Local population ....:	229	(0.032%)
Local off-base population ....:	229	
Number of school children ....:	41	
Demand for housing .... Rental:	101	
Owner occupied:	0	
Government expenditures............:	$2,025,000	
Government revenues ....:	$2,109,000	
Net Government revenues ....:	$84,000	
Civilian employees expected to relocate:	101	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $28,150,000
Local expenditures of project: $17,231,919.90 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2002)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$14,698,000	
Induced:	$23,198,000	
Total:	$37,896,000	(0.274%)
Employment .... Direct:	112	
Total:	474	(0.137%)
Income .... Direct:	$2,057,000	
Total (place of work):	$11,601,000	
Total (place of residence):	$11,539,000	(0.095%)
Local population ....:	126	(0.018%)
Local off-base population ....:	126	
Number of school children ....:	22	
Demand for housing .... Rental:	56	
Owner occupied:	0	
Government expenditures...........:	$1,717,000	
Government revenues ....:	$1,164,000	
Net Government revenues ....:	$47,000	
Civilian employees expected to relocate:	56	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $24,802,000
Local expenditures of project: $15,182,453.91 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2003)

Export income multiplier:	2.5783	
Change in local		
Sales volume .... Direct:	$12,950,000	
Induced:	$20,439,000	
Total:	$33,389,000	(0.241%)
Employment .... Direct:	98	
Total:	417	(0.120%)
Income .... Direct:	$1,813,000	
Total (place of work):	$10,222,000	
Total (place of residence):	$10,166,000	(0.083%)
Local population ....:	111	(0.016%)
Local off-base population ....:	111	
Number of school children ....:	20	
Demand for housing .... Rental:	49	
Owner occupied:	0	
Government expenditures............:	$985,000	
Government revenues ....:	$1,026,000	
Net Government revenues ....:	$41,000	
Civilian employees expected to relocate:	49	
Military employees expected to relocate:	0	

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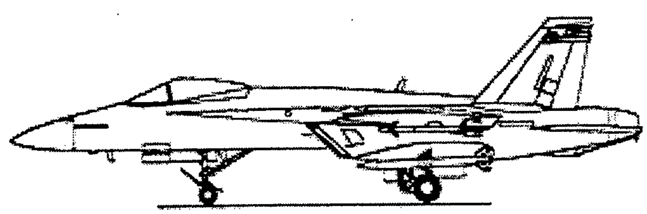


EIFS Model Results for NAF El Centro

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

POPULATION

YEAR	Population	change	deviation	%deviation
1969	73,600			
1970	74,800	1,200	-1,209	-1.642 %
1971	74,900	100	-2,309	-3.086 %
1972	75,900	1,000	-1,409	-1.881 %
1973	79,600	3,700	1,291	1.701 %
1974	81,500	1,900	-509	-0.639 %
1975	83,000	1,500	-909	-1.115 %
1976	85,300	2,300	-109	-0.131 %
1977	87,000	1,700	-709	-0.831 %
1978	88,500	1,500	-909	-1.044 %
1979	90,100	1,600	-809	-0.914 %
1980	92,900	2,800	391	0.434 %
1981	94,800	1,900	-509	-0.548 %
1982	96,600	1,800	-609	-0.642 %
1983	98,300	1,700	-709	-0.734 %
1984	99,300	1,000	-1,409	-1.433 %
1985	101,500	2,200	-209	-0.210 %
1986	101,700	200	-2,209	-2.176 %
1987	103,400	1,700	-709	-0.697 %
1988	105,700	2,300	-109	-0.105 %
1989	107,800	2,100	-309	-0.292 %
1990	111,100	3,300	891	0.827 %
1991	118,500	7,400	4,991	4.493 %
1992	129,000	10,500	8,091	6.828 %

average yearly change:	2,409
maximum historic positive deviation:	8,091
maximum historic negative deviation:	-2,309
maximum historic % positive deviation:	6.828 %
maximum historic % negative deviation:	-3.086 %
positive rtv:	6.828 %
negative rtv:	-1.543 %

Source: Bureau of Economic Analysis

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

EMPLOYMENT

YEAR	Employment	change	deviation	%deviation
1969	33,653			
1970	33,858	205	-646	-1.919 %
1971	33,916	58	-793	-2.342 %
1972	34,936	1,020	169	0.498 %
1973	36,607	1,671	820	2.347 %
1974	39,457	2,850	1,999	5.461 %
1975	42,220	2,763	1,912	4.846 %
1976	44,472	2,252	1,401	3.318 %
1977	44,214	-258	-1,109	-2.494 %
1978	44,479	265	-586	-1.325 %
1979	46,474	1,995	1,144	2.572 %
1980	45,249	-1,225	-2,076	-4.467 %
1981	43,737	-1,512	-2,363	-5.222 %
1982	43,474	-263	-1,114	-2.547 %
1983	43,121	-353	-1,204	-2.759 %
1984	42,637	-484	-1,335	-3.096 %
1985	41,388	-1,249	-2,100	-4.925 %
1986	42,777	1,389	538	1.300 %
1987	43,760	983	132	0.309 %
1988	47,737	3,977	3,126	7.144 %
1989	52,473	4,736	3,885	8.138 %
1990	52,896	423	-428	-0.816 %
1991	51,334	-1,562	-2,413	-4.562 %
1992	53,225	1,891	1,040	2.026 %

average yearly change:	851
maximum historic positive deviation:	3,885
maximum historic negative deviation:	-2,413
maximum historic % positive deviation:	8.138 %
maximum historic % negative deviation:	-5.222 %
positive rtv:	8.138 %
negative rtv:	-3.499 %

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

BUSINESS VOLUME (using Non-Farm Income)

YEAR	Non-Farm income	adjusted income	change	deviation	%deviation
1969	152,212	450,331			
1970	161,730	451,760	1,428	-17,842	-3.962 %
1971	171,617	460,099	8,339	-10,931	-2.420 %
1972	186,227	482,453	22,354	3,083	0.670 %
1973	213,909	521,729	39,276	20,005	4.147 %
1974	247,862	544,752	23,022	3,752	0.719 %
1975	280,774	564,938	20,186	915	0.168 %
1976	318,020	605,752	40,815	21,544	3.814 %
1977	345,578	618,207	12,455	-6,816	-1.125 %
1978	382,167	634,829	16,621	-2,649	-0.429 %
1979	429,228	640,639	5,810	-13,461	-2.120 %
1980	461,457	606,382	-34,256	-53,527	-8.355 %
1981	492,046	586,467	-19,915	-39,186	-6.462 %
1982	502,661	565,423	-21,044	-40,315	-6.874 %
1983	506,253	552,678	-12,745	-32,016	-5.662 %
1984	552,581	582,891	30,213	10,943	1.980 %
1985	588,297	599,691	16,800	-2,471	-0.424 %
1986	645,186	668,587	68,895	49,625	8.275 %
1987	700,289	700,289	31,702	12,432	1.859 %
1988	792,804	762,312	62,023	42,752	6.105 %
1989	866,829	795,256	32,944	13,674	1.794 %
1990	957,500	834,786	39,530	20,260	2.548 %
1991	995,033	833,361	-1,425	-20,696	-2.479 %
1992	1,097,293	893,561	60,200	40,929	4.911 %

average yearly change:	19,271
maximum historic positive deviation:	49,625
maximum historic negative deviation:	-53,527
maximum historic % positive deviation:	8.275 %
maximum historic % negative deviation:	-8.355 %
positive rtv:	8.275 %
negative rtv:	-6.266 %

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

PERSONAL INCOME

YEAR	Personal income	adjusted income	change	deviation	%deviation
1969	268,690	794,941			
1970	281,882	787,380	-7,561	-36,138	-4.546 %
1971	281,045	753,472	-33,908	-62,485	-7.936 %
1972	363,601	941,972	188,500	159,923	21.225 %
1973	401,349	978,900	36,928	8,352	0.887 %
1974	462,279	1,015,998	37,098	8.321	0.870 %
1975	490,557	987,036	-28,962	-57,538	-5.663 %
1976	549,020	1,045,752	58,716	30,139	3.054 %
1977	569,560	1,018,891	-26,862	-55,438	-5.301 %
1978	625,286	1,038,681	19,790	-8,787	-0.862 %
1979	900,513	1,344,049	305,368	276,791	26.648 %
1980	854,260	1,122,549	-221,500	-250,077	-18.606 %
1981	893,129	1,064,516	-58,033	-86,610	-7.715 %
1982	987,808	1,111,145	46.629	18.052	1.696 %
1983	1,028,069	1,122,346	11,201	-17,376	-1.564 %
1984	1,066,454	1,124,951	2,605	-25,971	-2.314 %
1985	1,062,805	1,083,389	-41,562	-70,139	-6.235 %
1986	1,092,758	1,132,392	49,002	20,426	1.885 %
1987	1,259,735	1,259,735	127.343	98,767	8.722 %
1988	1,439,442	1,384,079	124,344	95,767	7.602 %
1989	1,599,199	1,467,155	83,076	54,499	3.938 %
1990	1,693,858	1,476,772	9,617	-18,959	-1.292 %
1991	1,684,094	1,410,464	-66,309	-94,885	-6.425 %
1992	1,783,310	1,452,207	41,743	13,166	0.933 %

average yearly change:	28,577
maximum historic positive deviation:	276,791
maximum historic negative deviation:	-250,077
maximum historic % positive deviation:	26.648 %
maximum historic % negative deviation:	-18.606 %
positive rtv:	26.648 %
negative rtv:	-12.466 %

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 at El Centro (1999)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  153
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (1999)

Export income multiplier:                       1.6798
Change in local
  Sales volume .............. Direct:       $6,749,000
                             Induced:       $4,588,000
                               Total:      $11,338,000    (   0.741%)
  Employment ................ Direct:               50
                               Total:              438    (   1.000%)
  Income .................... Direct:         $838,000
               Total (place of work):      $13,276,000
          Total (place of residence):      $13,276,000    (   0.834%)
  Local population .................:              381    (   0.368%)
  Local off-base population ........:              225
  Number of school children ........:               65
  Demand for housing ........ Rental:               58
                      Owner occupied:               32
  Government expenditures...........:       $1,102,000
  Government revenues ..............:       $2,995,000
  Net Government revenues ..........:       $1,893,000
Civilian employees expected to relocate:             0
Military employees expected to relocate:           153
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 at El Centro (2000)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0
Change in military employment:  802
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2000)

Export income multiplier:                       1.6798
Change in local
  Sales volume .............. Direct:      $15,640,000
                             Induced:      $10,632,000
                               Total:      $26,272,000    (   1.717%)
  Employment ................ Direct:              117
                               Total:            1,198    (   2.738%)
  Income .................... Direct:       $1,942,000
               Total (place of work):      $39,293,000
          Total (place of residence):      $39,293,000    (   2.470%)
  Local population .................:            1,997    (   1.931%)
  Local off-base population ........:            1,178
  Number of school children ........:              345
  Demand for housing ........ Rental:              303
                      Owner occupied:              170
  Government expenditures...........:       $3,407,000
  Government revenues ..............:       $9,777,000
  Net Government revenues ..........:       $6,369,000
Civilian employees expected to relocate:             0
Military employees expected to relocate:           802
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2001)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  970
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2001)

Export income multiplier:                            1.6798
Change in local
  Sales volume .............. Direct:           $17,942,000
                             Induced:           $12,197,000
                               Total:           $30,138,000   (  1.969%)
  Employment ................ Direct:                   134
                               Total:                 1,395   (  3.188%)
  Income .................... Direct:            $2,228,000
                Total (place of work):           $46,028,000
           Total (place of residence):           $46,028,000   (  2.893%)
  Local population ..................:                 2,415   (  2.336%)
  Local off-base population .........:                 1,425
  Number of school children .........:                   418
  Demand for housing ......... Rental:                   366
                       Owner occupied:                   206
  Government expenditures............:            $4,004,000
  Government revenues ...............:           $11,532,000
  Net Government revenues ...........:            $7,528,000
Civilian employees expected to relocate:                   0
Military employees expected to relocate:                 970
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2002)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  1,244
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2002)

Export income multiplier:                            1.6798
Change in local
  Sales volume .............. Direct:           $21,695,000
                             Induced:           $14,748,000
                               Total:           $36,443,000   (  2.381%)
  Employment ................ Direct:                   162
                               Total:                 1,716   (  3.921%)
  Income .................... Direct:            $2,694,000
                Total (place of work):           $57,012,000
           Total (place of residence):           $57,012,000   (  3.583%)
  Local population ..................:                 3,098   (  2.996%)
  Local off-base population .........:                 1,828
  Number of school children .........:                   536
  Demand for housing ......... Rental:                   470
                       Owner occupied:                   264
  Government expenditures............:            $4,977,000
  Government revenues ...............:           $14,395,000
  Net Government revenues ...........:            $9,418,000
Civilian employees expected to relocate:                   0
Military employees expected to relocate:               1,244
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2003)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)        (CPI - 1993)       = 126.3
   baseline year (business volume)      (PPI - 1987)       = 100.0
   local services and supplies          (PPI - 1993)       = 115.7
   output and incomes (business volume) (PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  1,518
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2003)

Export income multiplier:                          1.6798
Change in local
  Sales volume .............. Direct:          $25,449,000
                             Induced:          $17,300,000
                               Total:          $42,749,000    (   2.793%)
  Employment ................ Direct:                  190
                               Total:                2,037    (   4.655%)
  Income .................... Direct:           $3,160,000
              Total (place of work):           $67,996,000
         Total (place of residence):           $67,996,000    (   4.274%)
  Local population ..................:               3,780    (   3.656%)
  Local off-base population .........:               2,230
  Number of school children .........:                 654
  Demand for housing ......... Rental:                 573
                       Owner occupied:                 322
  Government expenditures............:          $5,950,000
  Government revenues ...............:         $17,258,000
  Net Government revenues ...........:         $11,308,000
Civilian employees expected to relocate:                 0
Military employees expected to relocate:             1,518
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2004)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)        (CPI - 1993)       = 126.3
   baseline year (business volume)      (PPI - 1987)       = 100.0
   local services and supplies          (PPI - 1993)       = 115.7
   output and incomes (business volume) (PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  2,525
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2004)

Export income multiplier:                          1.6798
Change in local
  Sales volume .............. Direct:          $39,244,000
                             Induced:          $26,678,000
                               Total:          $65,921,000    (   4.307%)
  Employment ................ Direct:                  293
                               Total:                3,217    (   7.351%)
  Income .................... Direct:           $4,874,000
              Total (place of work):          $108,365,000
         Total (place of residence):          $108,365,000    (   6.811%)
  Local population ..................:               6,287    (   6.081%)
  Local off-base population .........:               3,709
  Number of school children .........:               1,088
  Demand for housing ......... Rental:                 953
                       Owner occupied:                 536
  Government expenditures............:          $9,526,000
  Government revenues ...............:         $27,780,000
  Net Government revenues ...........:         $18,254,000
Civilian employees expected to relocate:                 0
Military employees expected to relocate:             2,525
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2005)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  2,984
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2005)

Export income multiplier:                            1.6798
Change in local
  Sales volume .............. Direct:          $45,532,000
                             Induced:          $30,952,000
                               Total:          $76,484,000    (   4.998%)
  Employment ................ Direct:                  340
                               Total:                3,755    (   8.580%)
  Income .................... Direct:           $5,655,000
               Total (place of work):         $126,765,000
          Total (place of residence):         $126,765,000    (   7.967%)
  Local population .................:                7,430    (   7.186%)
  Local off-base population ........:                4,384
  Number of school children ........:                1,286
  Demand for housing ........ Rental:                1,127
                      Owner occupied:                  634
  Government expenditures...........:          $11,157,000
  Government revenues ..............:          $32,576,000
  Net Government revenues ..........:          $21,420,000
Civilian employees expected to relocate:                 0
Military employees expected to relocate:             2,984
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2006)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  2,984
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent

STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2006)

Export income multiplier:                            1.6798
Change in local
  Sales volume .............. Direct:          $45,532,000
                             Induced:          $30,952,000
                               Total:          $76,484,000    (   4.998%)
  Employment ................ Direct:                  340
                               Total:                3,755    (   8.580%)
  Income .................... Direct:           $5,655,000
               Total (place of work):         $126,765,000
          Total (place of residence):         $126,765,000    (   7.967%)
  Local population .................:                7,430    (   7.186%)
  Local off-base population ........:                4,384
  Number of school children ........:                1,286
  Demand for housing ........ Rental:                1,127
                      Owner occupied:                  634
  Government expenditures...........:          $11,157,000
  Government revenues ..............:          $32,576,000
  Net Government revenues ..........:          $21,420,000
Civilian employees expected to relocate:                 0
Military employees expected to relocate:             2,984
```

```
STANDARD EIFS FORECAST MODEL

Project name:  F/A-18 E/F at NAF El Centro (2007)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)      = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)      = 126.3
   baseline year (business volume)     (PPI - 1987)      = 100.0
   local services and supplies         (PPI - 1993)      = 115.7
   output and incomes (business volume)(PPI - 1993)      = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $107,500
Change in civilian employment:  200
Average income of affected civilian personnel:  $30,861
Percent expected to relocate: 0.0 percent
Change in military employment:  3,443
Average income of affected military personnel:  $37,230
Percent of military living on the base:  41.0 percent


STANDARD EIFS MODEL FORECAST FOR F/A-18 E/F at NAF El Centro (2007)

Export income multiplier:                          1.6798
Change in local
  Sales volume .............. Direct:         $51,820,000
                             Induced:         $35,227,000
                               Total:         $87,046,000    (   5.688%)
  Employment ................ Direct:                 387
                               Total:               4,293    (   9.809%)
  Income .................... Direct:          $6,435,000
                Total (place of work):        $145,165,000
           Total (place of residence):        $145,165,000    (   9.124%)
  Local population ..................:              8,573    (   8.291%)
  Local off-base population .........:              5,058
  Number of school children .........:              1,484
  Demand for housing ......... Rental:              1,300
                       Owner occupied:                731
  Government expenditures............:        $12,787,000
  Government revenues ...............:        $37,372,000
  Net Government revenues ...........:        $24,586,000
Civilian employees expected to relocate:                 0
Military employees expected to relocate:             3,443
```

CONSTRUCTION

Project name: NAF El Centro 1999

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $86,358,560
Local expenditures of project: 34,948,390.09 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF El Centro 1999

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$29,810,000	
Induced:	$20,265,000	
Total:	$50,074,000	(3.203%)
Employment .... Direct:	218	
Total:	753	(1.720%)
Income .... Direct:	$3,624,000	
Total (place of work):	$18,859,000	
Total (place of residence):	$18,859,000	(1.185%)
Local population ....:	263	(0.254%)
Local off-base population ....:	263	
Number of school children ....:	48	
Demand for housing .... Rental:	116	
Owner occupied:	0	
Government expenditures............:	$2,199,000	
Government revenues ....:	$4,155,000	
Net Government revenues ....:	$1,956,000	
Civilian employees expected to relocate:	116	
Military employees expected to relocate:	0	

CONSTRUCTION

Project name: NAF El Centro 2000

```
Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (construction)        (ENR-const - 1987) = 100.0
   local expenditures for construction (ENR-const - 1993) = 118.2
   output and incomes (construction)   (ENR-const - 1993) = 118.2

If entering total expenditures, enter  1
            local expenditures, enter  2  : 1
Dollar volume of construction project:  $289,134,000
Local expenditures of project:  117,009,452.45 (calculated)
Percent for labor:  34.2%
Percent for materials:  57.8%
Percent allowed for other:  8.0%
Percent of construction workers expected to migrate into the area: 30.0%
```

CONSTRUCTION IMPACT FORECAST FOR NAF El Centro 2000

```
Export income multiplier:                          1.6798
Change in local
  Sales volume ............... Direct:         $99,805,000
                              Induced:         $67,847,000
                                Total:        $167,652,000    (  10.723%)
  Employment ................. Direct:                 729
                                Total:               2,520    (   5.759%)
  Income ..................... Direct:         $12,133,000
              Total (place of work):           $63,140,000
          Total (place of residence):          $63,140,000    (   3.968%)
  Local population ..................:                 881    (   0.852%)
  Local off-base population .........:                 881
  Number of school children .........:                 161
  Demand for housing ......... Rental:                 389
                      Owner occupied:                    0
  Government expenditures............:          $7,361,000
  Government revenues ...............:         $13,911,000
  Net Government revenues ...........:          $6,550,000
Civilian employees expected to relocate:               389
Military employees expected to relocate:                 0
```

CONSTRUCTION

Project name: NAF El Centro 2001

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $82,615,000
Local expenditures of project: 33,433,411.20 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF El Centro 2001

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$28,518,000	
Induced:	$19,386,000	
Total:	$47,904,000	(3.064%)
Employment .... Direct:	208	
Total:	720	(1.646%)
Income .... Direct:	$3,467,000	
Total (place of work):	$18,041,000	
Total (place of residence):	$18,041,000	(1.134%)
Local population ....:	252	(0.243%)
Local off-base population ....:	252	
Number of school children ....:	46	
Demand for housing .... Rental:	111	
Owner occupied:	0	
Government expenditures............:	$2,103,000	
Government revenues ....:	$3,975,000	
Net Government revenues ....:	$1,872,000	
Civilian employees expected to relocate:	111	
Military employees expected to relocate:	0	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $283,343
Change in civilian employment: 26
Average income of affected civilian personnel: $25,734
Percent expected to relocate: 38.1%
Change in military employment: 237
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (1998)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$2,977,000	
Induced:	$2,024,000	
Total:	$5,001,000	(0.327%)
Employment .... Direct:	22	
Total:	300	(0.686%)
Income .... Direct:	$370,000	
Total (place of work):	$7,768,000	
Total (place of residence):	$7,768,000	(0.488%)
Local population ....:	620	(0.599%)
Local off-base population ....:	425	
Number of school children ....:	104	
Demand for housing .... Rental:	106	
Owner occupied:	63	
Government expenditures............:	$1,057,000	
Government revenues ....:	$2,274,000	
Net Government revenues ....:	$1,217,000	
Civilian employees expected to relocate:	10	
Military employees expected to relocate:	237	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 1,101
Average income of affected military personnel: $28,707
Percent of military living on the base: 34.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (1999)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$19,272,000	
Induced:	$13,101,000	
Total:	$32,373,000	(2.115%)
Employment .... Direct:	144	
Total:	1,648	(3.765%)
Income .... Direct:	$2,393,000	
Total (place of work):	$44,501,000	
Total (place of residence):	$44,501,000	(2.797%)
Local population ....:	2,861	(2.767%)
Local off-base population ....:	1,929	
Number of school children ....:	491	
Demand for housing .... Rental:	482	
Owner occupied:	285	
Government expenditures............:	$5,358,000	
Government revenues ....:	$12,129,000	
Net Government revenues ....:	$6,771,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	1,101	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 1,750
Average income of affected military personnel: $31,868
Percent of military living on the base: 37.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2000)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$28,166,000	
Induced:	$19,147,000	
Total:	$47,314,000	(3.092%)
Employment .... Direct:	210	
Total:	2,408	(5.503%)
Income .... Direct:	$3,498,000	
Total (place of work):	$70,519,000	
Total (place of residence):	$70,519,000	(4.432%)
Local population ....:	4,477	(4.330%)
Local off-base population ....:	2,865	
Number of school children ....:	771	
Demand for housing .... Rental:	723	
Owner occupied:	420	
Government expenditures............:	$7,625,000	
Government revenues ....:	$18,879,000	
Net Government revenues ....:	$11,254,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	1,750	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 1,918
Average income of affected military personnel: $32,337
Percent of military living on the base: 37.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2001)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$30,516,000	
	Induced:	$20,745,000	
	Total:	$51,261,000	(3.349%)
Employment	Direct:	228	
	Total:	2,605	(5.945%)
Income	Direct:	$3,790,000	
	Total (place of work):	$77,263,000	
	Total (place of residence):	$77,263,000	(4.856%)
Local population	:	4,895	(4.734%)
Local off-base population	:	3,128	
Number of school children	:	843	
Demand for housing	Rental:	790	
	Owner occupied:	458	
Government expenditures...........	:	$8,259,000	
Government revenues	:	$20,666,000	
Net Government revenues	:	$12,407,000	
Civilian employees expected to relocate	:	40	
Military employees expected to relocate	:	1,918	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 2,192
Average income of affected military personnel: $32,949
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2002)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$34,209,000	
Induced:	$23,255,000	
Total:	$57,463,000	(3.755%)
Employment .... Direct:	255	
Total:	2,926	(6.686%)
Income .... Direct:	$4,248,000	
Total (place of work):	$88,235,000	
Total (place of residence):	$88,235,000	(5.546%)
Local population ....:	5,578	(5.394%)
Local off-base population ....:	3,504	
Number of school children ....:	961	
Demand for housing .... Rental:	887	
Owner occupied:	512	
Government expenditures............:	$9,172,000	
Government revenues ....:	$23,478,000	
Net Government revenues ....:	$14,307,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	2,192	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

```
Project name:   NAF El Centro (2003)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $674,187
Change in civilian employment:  305
Average income of affected civilian personnel:  $29,096
Percent expected to relocate:  13.12%
Change in military employment:  2,466
Average income of affected military personnel:  $33,425
Percent of military living on the base:  38.0%
```

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2003)

```
Export income multiplier:                          1.6798
Change in local
  Sales volume ............... Direct:        $38,022,000
                              Induced:        $25,847,000
                                Total:        $63,870,000    (    4.173%)
  Employment ................. Direct:                284
                                Total:              3,248    (    7.421%)
  Income ..................... Direct:         $4,722,000
              Total (place of work):          $99,232,000
         Total (place of residence):          $99,232,000    (    6.237%)
  Local population ..................:              6,260    (    6.054%)
  Local off-base population .........:              3,927
  Number of school children .........:              1,079
  Demand for housing ......... Rental:                995
                       Owner occupied:                573
  Government expenditures............:        $10,191,000
  Government revenues ...............:        $26,380,000
  Net Government revenues ...........:        $16,190,000
Civilian employees expected to relocate:               40
Military employees expected to relocate:            2,466
```

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2004)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 3,473
Average income of affected military personnel: $33,425
Percent of military living on the base: 39.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2004)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$51,802,000	
Induced:	$35,215,000	
Total:	$87,017,000	(5.686%)
Employment .... Direct:	387	
Total:	4,427	(10.117%)
Income .... Direct:	$6,433,000	
Total (place of work):	$139,597,000	
Total (place of residence):	$139,597,000	(8.774%)
Local population ....:	8,767	(8.479%)
Local off-base population ....:	5,395	
Number of school children ....:	1,514	
Demand for housing .... Rental:	1,373	
Owner occupied:	786	
Government expenditures...........:	$13,742,000	
Government revenues ....:	$36,881,000	
Net Government revenues ....:	$23,139,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	3,473	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2005)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 3,932
Average income of affected military personnel: $34,843
Percent of military living on the base: 39.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2005)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$58,156,000	
Induced:	$39,534,000	
Total:	$97,691,000	(6.383%)
Employment .... Direct:	434	
Total:	4,966	(11.348%)
Income .... Direct:	$7,222,000	
Total (place of work):	$158,009,000	
Total (place of residence):	$158,009,000	(9.931%)
Local population ....:	9,910	(9.584%)
Local off-base population ....:	6,092	
Number of school children ....:	1,711	
Demand for housing .... Rental:	1,552	
Owner occupied:	887	
Government expenditures............:	$15,423,000	
Government revenues ....:	$41,720,000	
Net Government revenues ....:	$26,297,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	3,932	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

```
Project name:   NAF El Centro (2006)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)       = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)       = 126.3
   baseline year (business volume)     (PPI - 1987)       = 100.0
   local services and supplies         (PPI - 1993)       = 115.7
   output and incomes (business volume)(PPI - 1993)       = 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter  1
            local expenditures, enter  2  : 2
Change in expenditures for local services and supplies:  $674,187
Change in civilian employment:  305
Average income of affected civilian personnel:  $29,096
Percent expected to relocate:  13.12%
Change in military employment:  3,932
Average income of affected military personnel:  $34,843
Percent of military living on the base:  39.0%
```

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2006)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$58,156,000	
Induced:	$39,534,000	
Total:	$97,691,000	(6.383%)
Employment .... Direct:	434	
Total:	4,966	(11.348%)
Income .... Direct:	$7,222,000	
Total (place of work):	$158,009,000	
Total (place of residence):	$158,009,000	(9.931%)
Local population ....:	9,910	(9.584%)
Local off-base population ....:	6,092	
Number of school children ....:	1,711	
Demand for housing .... Rental:	1,552	
Owner occupied:	887	
Government expenditures............:	$15,423,000	
Government revenues ....:	$41,720,000	
Net Government revenues ....:	$26,297,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	3,932	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2007)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187
Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 2,466
Average income of affected military personnel: $33,425
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2007)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$38,022,000	
Induced:	$25,847,000	
Total:	$63,870,000	(4.173%)
Employment .... Direct:	284	
Total:	3,248	(7.421%)
Income .... Direct:	$4,722,000	
Total (place of work):	$99,232,000	
Total (place of residence):	$99,232,000	(6.237%)
Local population ....:	6,260	(6.054%)
Local off-base population ....:	3,927	
Number of school children ....:	1,079	
Demand for housing .... Rental:	995	
Owner occupied:	573	
Government expenditures............:	$10,191,000	
Government revenues ....:	$26,380,000	
Net Government revenues ....:	$16,190,000	
Civilian employees expected to relocate:	40	
Military employees expected to relocate:	2,466	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (1998)

```
Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)        = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)        = 126.3
   baseline year (construction)        (ENR-const - 1987) = 100.0
   local expenditures for construction (ENR-const - 1993) = 118.2
   output and incomes (construction)   (ENR-const - 1993) = 118.2

If entering total expenditures, enter  1
            local expenditures, enter  2  : 1
Dollar volume of construction project:  $27,329,000
Local expenditures of project:  $11,059,755.43 (calculated)
Percent for labor:  34.2%
Percent for materials:  57.8%
Percent allowed for other:  8.0%
Percent of construction workers expected to migrate into the area: 30.0%
```

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (1998)

```
Export income multiplier:                        1.6798
Change in local
  Sales volume ............... Direct:       $9,434,000
                              Induced:       $6,413,000
                                Total:      $15,847,000    (   1.014%)
  Employment ................. Direct:               69
                                Total:              238    (   0.544%)
  Income ..................... Direct:       $1,147,000
              Total (place of work):         $5,968,000
         Total (place of residence):         $5,968,000    (   0.375%)
  Local population ..................:               83    (   0.081%)
  Local off-base population .........:               83
  Number of school children .........:               15
  Demand for housing ......... Rental:               37
                       Owner occupied:                0
  Government expenditures............:         $696,000
  Government revenues ...............:       $1,315,000
  Net Government revenues ...........:         $619,000
Civilian employees expected to relocate:             37
Military employees expected to relocate:              0
```

```
CONSTRUCTION CUMULATIVE IMPACTS

Project name:  NAF El Centro (1999)

Default price deflators:
   baseline year (ex. business volume) (CPI - 1987)        = 100.0
   output and incomes  (ex b.v.)       (CPI - 1993)        = 126.3
   baseline year (construction)        (ENR-const - 1987) = 100.0
   local expenditures for construction (ENR-const - 1993) = 118.2
   output and incomes (construction)   (ENR-const - 1993) = 118.2

If entering total expenditures, enter  1
            local expenditures, enter  2  : 1
Dollar volume of construction project:  $57,990,000
Local expenditures of project:  $23,467,935.79 (calculated)
Percent for labor:  34.2%
Percent for materials:  57.8%
Percent allowed for other:  8.0%
Percent of construction workers expected to migrate into the area: 30.0%


CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (1999)

Export income multiplier:                        1.6798
Change in local
  Sales volume ............... Direct:      $20,017,000
                              Induced:      $13,608,000
                                Total:      $33,625,000    (   2.151%)
  Employment ................. Direct:              146
                                Total:              505    (   1.155%)
  Income ..................... Direct:       $2,433,000
                Total (place of work):      $12,664,000
           Total (place of residence):      $12,664,000    (   0.796%)
  Local population ..................:              177    (   0.171%)
  Local off-base population .........:              177
  Number of school children .........:               32
  Demand for housing ......... Rental:               78
                       Owner occupied:                0
  Government expenditures............:       $1,476,000
  Government revenues ...............:       $2,790,000
  Net Government revenues ...........:       $1,314,000
Civilian employees expected to relocate:             78
Military employees expected to relocate:              0
```

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2000)

Default price deflators:
baseline year (ex. business volume) (CPI - 1987) = 100.0
output and incomes (ex b.v.) (CPI - 1993) = 126.3
baseline year (construction) (ENR-const - 1987) = 100.0
local expenditures for construction (ENR-const - 1993) = 118.2
output and incomes (construction) (ENR-const - 1993) = 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $42,871,000
Local expenditures of project: $17,349,437.41 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2000)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$14,799,000	
Induced:	$10,060,000	
Total:	$24,858,000	(1.590%)
Employment .... Direct:	108	
Total:	374	(0.854%)
Income .... Direct:	$1,799,000	
Total (place of work):	$9,362,000	
Total (place of residence):	$9,362,000	(0.588%)
Local population ....:	131	(0.126%)
Local off-base population ....:	131	
Number of school children ....:	24	
Demand for housing .... Rental:	58	
Owner occupied:	0	
Government expenditures............:	$1,091,000	
Government revenues ....:	$2,063,000	
Net Government revenues ....:	$971,000	
Civilian employees expected to relocate:	58	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,000,000
Local expenditures of project: $20,639,157.19 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2001)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$17,605,000	
Induced:	$11,967,000	
Total:	$29,572,000	(1.891%)
Employment .... Direct:	129	
Total:	445	(1.016%)
Income .... Direct:	$2,140,000	
Total (place of work):	$11,137,000	
Total (place of residence):	$11,137,000	(0.700%)
Local population ....:	155	(0.150%)
Local off-base population ....:	155	
Number of school children ....:	28	
Demand for housing .... Rental:	69	
Owner occupied:	0	
Government expenditures............:	$1,298,000	
Government revenues ....:	$2,454,000	
Net Government revenues ....:	$1,155,000	
Civilian employees expected to relocate:	69	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $28,150,000
Local expenditures of project: $11,392,005.39 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2002)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$9,717,000	
Induced:	$6,606,000	
Total:	$16,323,000	(1.044%)
Employment .... Direct:	71	
Total:	245	(0.561%)
Income .... Direct:	$1,181,000	
Total (place of work):	$6,147,000	
Total (place of residence):	$6,147,000	(0.386%)
Local population ....:	86	(0.083%)
Local off-base population ....:	86	
Number of school children ....:	15	
Demand for housing .... Rental:	38	
Owner occupied:	0	
Government expenditures............:	$717,000	
Government revenues ....:	$1,354,000	
Net Government revenues ....:	$638,000	
Civilian employees expected to relocate:	38	
Military employees expected to relocate:	0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2003)

Default price deflators:

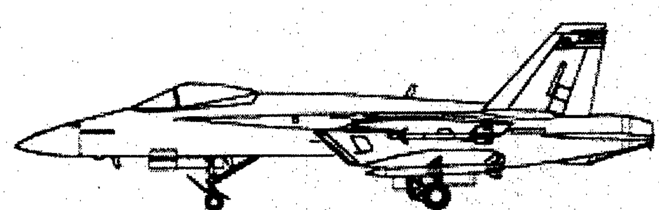
baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1

Dollar volume of construction project: $24,802,000
Local expenditures of project: $10,037,105.42 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2003)

Export income multiplier:	1.6798	
Change in local		
Sales volume .... Direct:	$8,561,000	
Induced:	$5,820,000	
Total:	$14,381,000	(0.920%)
Employment .... Direct:	63	
Total:	216	(0.494%)
Income .... Direct:	$1,041,000	
Total (place of work):	$5,416,000	
Total (place of residence):	$5,416,000	(0.340%)
Local population ....:	76	(0.073%)
Local off-base population ....:	76	
Number of school children ....:	13	
Demand for housing .... Rental:	33	
Owner occupied:	0	
Government expenditures............:	$631,000	
Government revenues ....:	$1,193,000	
Net Government revenues ....:	$562,000	
Civilian employees expected to relocate:	33	
Military employees expected to relocate:	0	



APPENDIX C
CULTURAL RESOURCES

C.1 NAS Lemoore C-1

C.2 NAF El Centro C-3

APPENDIX C
CULTURAL RESOURCES

C.1 NAS LEMOORE

Prehistory

It is generally believed that human occupation of the San Joaquin Valley dates back to at least 10,000 years before present (BP). At least one site in the valley is thought to have been occupied between 40,000 to 200,000 years BP; however, the reliability of the dating techniques used and the validity of the association of human remains with extinct fauna remains found within the site remains highly controversial. The lifeways of any inhabitants of California during the Pleistocene Epoch (pre-10,000 years BP) is largely unknown. A hunting/gathering strategy has been theorized; however, direct evidence of plant use is lacking and there are few documented relationships between tools and extinct faunal remains. No milling-related artifacts have been found within sites dating to this period. Use of wood, bone, and stone tools is thought to have occurred (Moratto 1984).

Archaeological evidence for occupation of California during the Holocene Epoch (10,000 years BP to present) is stronger. Early Holocene Period (10,000 to 8,000 years BP) sites are common throughout California. Hunter/gatherers were attracted to lacustrine and marshland settings for the varied and abundant resources found there. Milling-related artifacts are lacking during this period, but the atlatl and dart are common. Heat-treating of lithic materials for tool manufacture is also evident. Hunting of large and small game occurred, as well as fishing. Limited permanent settlements may have been established near large water sources, but a nomadic lifestyle was more common (Moratto 1984).

Milling of plant materials may have commenced later in the Holocene Epoch. Milling-related artifacts first appear in sites dating to the Early Horizon Period (8,000 to 4,000 years BP), but occur infrequently on these sites. Hunting and gathering continued during this period, especially of large game, but with greater reliance on vegetal foods. Mussels and oysters also were a staple. Greater

consumption of shellfish and increased milling activities occurred in the Middle Horizon Period (4,000 to 2,000 years BP). Use of bone artifacts increased and baked-earth steaming ovens were developed. Occupation of permanent or semi-permanent villages and reoccupation of seasonal sites was common in this period. During the Late Horizon Period (2,000 years BP to European Contact), subsistence activities became greatly diversified, exploiting a wide variety of resources. The mixed economy of this period emphasized fishing, hunting waterfowl, and collecting shellfish, roots, and seeds. Settlement of villages also increased, as did trade between different groups (Wallace 1978; Moratto 1984). During this time, regional subcultures developed, each with their own geographical territory and language or dialect.

Ethnohistory

The primary Native American group known to have used the southern San Joaquin Valley is the Southern Valley Yokuts. The Southern Valley Yokuts, geographically and linguistically distinguished from the neighboring Northern Valley and Foothill Yokuts, were divided into fifteen distinct tribes, each speaking a separate dialect of the Yokuts language and controlling a separate territory of approximately 250 square miles. The Tachi tribe occupied the territory encompassing the present-day NAS Lemoore. Each Southern Valley Yokuts tribe is estimated to have included approximately 350 people. Some tribes included only a single village, but more often several settlements comprised one tribe. Villages were occupied nearly year round, with families leaving for a few months to gather seeds and other wild plants in the spring or summer. During these times, dispersed camps were occupied near the shifting resources (Kroeber 1925; Wallace 1978).

In the villages, two types of dwellings were common. Single-family dwellings had an oval shape with a wooden frame covered with large mats of tule. Several tribes, including the Tachi, also built long, steep-roofed communal residences that sheltered 10 or more families. Each family resided in a designated portion of the structures and had their own fireplace and door. Communal cooking took place under a mat-covered porch along the front of the structure. Each settlement also had one communal sweathouse (Wallace 1978).

Subsistence practices of the Southern Valley Yokuts emphasized fishing, hunting waterfowl, and collecting shellfish, roots, and seeds. Antelope and elk were hunted from the lake shores. Wild pigeons, rabbits, and squirrels were also consumed. Large quantities of mussels were gathered and turtles were commonly eaten. Tule roots and seeds were a staple. Although acorns were not readily available in their territory, Tachi members traveled to neighboring territories to trade fish for acorns (Wallace 1978).

Mortuary practices of the Southern Valley Yokuts included burial preparation of the body by paid undertakers. The corpse was tightly bound and placed with the head to the west or northwest in a grave dug in a community cemetery. The cemetery was typically outside the village. Personal effects of the deceased were

interred with the body. Cremation was practiced when death occurred away from home. Important members of the Tachi tribe were also cremated. Charred bones were then gathered and buried in the cemetery (Wallace 1978).

The aboriginal population of the Southern Valley Yokuts has been estimated at between 5,250 and 15,700. Although contact with Europeans first occurred in the 1770s, the Southern Valley Yokuts were not drastically effected until Americans settled the valley in the mid-1800s. Many Southern Valley Yokuts were eventually settled in the Tule River Reservation, while a separate settlement for Tachi was established near NAS Lemoore. In the early 1970s, the Tachi population on the Santa Rosa Reservation near NAS Lemoore was only 100, while 325 Yokuts lived on the Tule River Reservation (Wallace 1978).

History

In 1772, Pedro Fages passed through the Southern San Joaquin Valley on his way to San Luis Obispo. Four years later, Francisco Garces, a Franciscan friar, visited the area and kept a detailed journal of his journey. Active explorations began in 1802 with the second administration of Governor Jose Arrillaga, who was eager to gain a foothold in the interior. Several expeditions occurred, beginning in 1806. During the period when Mexico ruled California (1822-1846), no rancheros were established within the southern San Joaquin Valley and Mexican influence on the Southern Yokuts were minimal (Gallegos and Associates 1997a).

Following the annexation of California by the United States in 1845, settlers quickly occupied the San Joaquin Valley. The first community was Visalia founded in 1852. The cities of Hanford and Lemoore were founded circa 1877 when the Southern Pacific Railroad was extended westward from the town of Goshen. By 1891, Lemoore was the largest wool shipping point in California (Gallegos and Associates 1997a).

NAS Lemoore was established in 1957 when the Navy acquired over 18,000 acres of agricultural land for station operations. At that time, existing farm houses and outbuildings were razed (Uribe and Associates 1994). The primary mission at NAS Lemoore includes a rapid response force of jet fighter and ground support aircraft to meet aggressor actions. The base was commissioned in 1961 and began operations during the height of the Cold War (Uribe and Associates 1994).

C.2 NAF El Centro

Prehistory

The prehistory of the Colorado Desert region includes three major periods of occupation: the Paleoindian Period (12,000 to 7,000 years BP), the Archaic Period (7,000 to 1,200 years BP), and the Patayan Period (1,200 years BP to European Contact). An earlier occupation has been suggested, but there is little evidence to support the claim. The Paleoindian Period is commonly known as the San Dieguito Complex. The San Dieguito populations were mobile hunter-gatherers

whose seasonal rounds covered large territories. Sites of this period are frequently on terraces overlooking major washes and extinct lake shores. In subsequent phases within this period, lithic tools become smaller and more sophisticated. Milling-related tools are absent (Moratto 1984; Apple *et al.* 1994).

During the Archaic Period, hunting and gathering continue but with greater regional specialization. Sites of this period indicate an adaptation to the drier and warmer climate of the Holocene Epoch. Lithic tools and milling-related artifacts are common. The region encompassing NAF El Centro, however, includes a relative lack of sites dating to this period. This has led debates over the possible abandonment of the area during this time (Moratto 1984; Apple *et al.* 1994).

The Patayan Period is characterized by the appearance of pottery and floodplain agriculture. During this period, small mobile groups occupied seasonal settlements along the Colorado floodplain. This period encompasses the appearance and disappearance of Lake Cahuilla (approximately 1,000 to 350 years BP, respectively). The now extinct lake is thought to have attracted people from the Colorado River who introduced new technology and pottery (Moratto 1984; Apple *et al.* 1994).

Ethnohistory

The region encompassing the present-day NAF El Centro was occupied prehistorically by the Tipai. Tipai territory included the coast shore from San Diego to Ensenada, Mexico and east as far as the Chocolate Mountains. Tipai were loosely organized into bands or autonomous tribelets. Each band controlled a portion of land with boundaries identified by natural landmarks. Communal claims were made to all springs and food resources within that land and boundaries were protected against trespassers. Permanent settlements were rare. Instead, campsites were seasonally reoccupied within a band's territory. Occasionally several bands wintered together in one location but dispersed in the spring. Winter villages included a cluster of dwellings, typically dome-shaped and thatched with brush and grass. In the summer, windbreaks, trees, or caves served as shelter. Ceremonial structures were also built within villages; however, sweathouses were not common (Luomala 1978).

Subsistence was based on hunting and gathering with several families joining together at a campsite to gather, process, and cache vegetal foods. Seasonal rounds followed ripening plants from the valleys to the mountains. During different seasons, agave, mesquite, cactus fruits, buds and blossoms, seeds, wild fruit, acorns, and piñon nuts were gathered. Deer, snakes, and birds were hunted, but rodents provided most of the meat in the Tipai diet. Insects and larvae were also consumed. Trade of acorns, agave, mesquite, and gourds for salt, dried seaweed and other greens, and abalone shells was common with the northwestern neighboring Ipai (Luomala 1978).

Upon death, the Tipai body was laid over a pit with the head facing south or east. The corpse was cremated along with possessions of the deceased. Afterwards, the pit was either filled in or the ashes and burned bones were gathered into a pottery jar. The jar was then hidden in the mountains (Luomala 1978).

The Tipai lifestyle began to change with the establishment of the San Diego Mission in 1769. Within a decade, the mission had converted almost 1,500 Tipai and Ipai to Catholicism and had introduced agriculture as a way of life. Secularization of the missions in the 1830s resulted in Tipais becoming serfs on the large Mexican land grants given to new settlers. Others fled to the mountains and became fugitives. With American control of California, Tipai served as laborers for ranches, mines, and towns. By 1968, 12 reservations had been established exclusively for Tipai and Ipai members, with Tipai also residing on several other reservations shared by many groups. Population figures for Tipai in 1770 were estimated at 3,000 but included only mission converts. In 1968, the population numbered 1,322 (Luomala 1978).

History

In 1774, Captain Juan Bautista led the first expedition from Tubac, Sonora (near Tucson, Arizona), to Alta California and established the Anza trade route. In 1781, the Quechan Indians attacked and destroyed Spanish settlements at the Yuma river crossing on the Colorado River. As a result, the Spanish abandoned this transportation route (Apple *et al.* 1994).

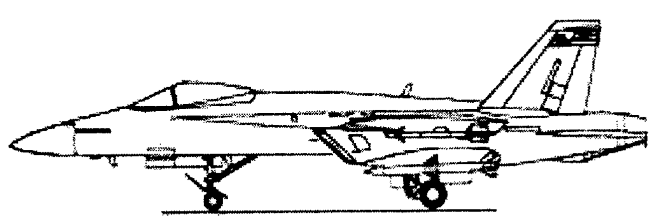
The Anza trail was reestablished during the war between the United States and Mexico. Shortly before the Treaty of Guadalupe-Hidalgo ended the war in 1848, gold was discovered in California. During the next few years, gold rush miners used the trail as an overland route. In 1859, Fort Yuma was established along the Colorado River at the route crossing below the Gila River confluence (Apple *et al.* 1994).

In 1900, investors in the California Development Company formed the Imperial Land Company to survey and develop lands to attract settlers. During the next few years, the Imperial Land Company established townsites for Imperial, Brawley, Calexico, Hever, and Silsbee. The Southern Pacific Railroad constructed a spurline from their transcontinental line at Niland south through the valley to Calexico. Soon after, the Imperial Valley experienced rapid development. In May 1901, the California Development Company opened the first irrigation canal into the valley area. By 1907, the valley had grown to the point that the citizens formed Imperial County from the eastern half of San Diego county (Apple *et al.* 1994). As a result of the construction of Boulder Dam and the All-American Canal which supplied water, Imperial Valley received increasing recognition as a agricultural center in the 1930s and 1940s (Apple *et al.* 1994).

Military facilities, which were to become NAF El Centro, were constructed near Seeley, California in 1942 and 1943 around the previously existing Civil

Aeronautical Administration airfield (Apple *et al.* 1994). The facility served as a Marine Corps Air Station during World War II and was transferred to the Navy after the war. Through the years, NAF El Centro has been designated the Naval Air Facility, the Naval Auxiliary Landing Field, the Naval Air Station, the Naval Aerospace Recovery Facility and the National Parachute Test Range (US Navy 1988a).

NAF El Centro was involved in aeronautical escape system testing, evaluation, and design for 35 years. The Naval Parachute Experimental Division began operations at NAF El Centro in 1947, and the Joint Parachute Facility was established in 1951. The United States Naval Aerospace Recovery Facility was established in 1964 and was combined with the Naval Air Facility in 1973 to form the National Parachute Test Range. The parachute test function was transferred in 1979 to the Naval Weapons Center, China Lake (US Navy 1988a).

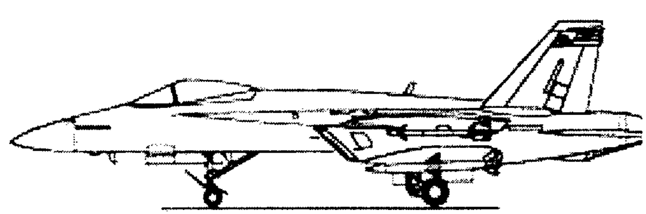


APPENDIX D
TRAFFIC AND CIRCULATION

D.1 AM AND PM PLUS F/A-18E/F TRAFFIC D-1

D.2 AM AND PM CUMULATIVE PLUS F/A-18E/F TRAFFIC D-25

D.3 AM AND PM MITIGATION PLUS F/A-18E/F TRAFFIC D-50



AM AND PM PLUS F/A-18E/F TRAFFIC

Table D-1
Traffic Impact Analysis: Existing AM and PM + F/A-18E/F Traffic

AM Existing + FA18 — Fri Oct 17, 1997 17:06:30 — Page 1-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Scenario Report

Scenario:	AM Existing + FA18
Command:	Default
Volume:	Existing AM
Geometry:	AM Existing
Impact Fee:	Default Impact Fee
Trip Generation:	AM FA-18
Trip Distribution:	E2 Default
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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AM Existing + FA18 — Fri Oct 17, 1997 17:06:30 — Page 2-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Personnel On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	433.00	FA 18 Personne	0.02	0.02	9	9	18	0.5
	Zone 101 Subtotal					9	9	18	0.5
102	Lemoore Hous	111.00	FA 18 Personne	0.02	0.02	2	2	4	0.1
	Zone 102 Subtotal					2	2	4	0.1
103	Lemoore Main	464.00	FA 18 Personne	0.02	0.02	9	9	18	0.5
	Zone 103 Subtotal					9	9	18	0.5
201	Pt. Magu #2	452.00	FA 18 Personne	0.02	0.02	9	9	18	0.5
	Zone 201 Subtotal					9	9	18	0.5
202	Pt. Magu # 1	45.00	FA 18 Personne	0.02	0.02	1	1	2	0.1
	Zone 202 Subtotal					1	1	2	0.1
203	Pt. Magu #3	407.00	FA 18 Personne	0.02	0.02	8	8	16	0.5
	Zone 203 Subtotal					8	8	16	0.5
307	NAF El Centr	1890.00	FA 18 Personne	0.02	0.02	38	38	76	2.3
	Zone 307 Subtotal					38	38	76	2.3
TOTAL						76	76	152	4.6

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

AM Existing + FA18 Fri Oct 17, 1997 17:06:30 Page 3-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Spouses/Dependants On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	178.00	FA 18 Spouse O	0.00	0.30	0	53	53	1.6
	Zone 101 Subtotal					0	53	53	1.6
102	Lemoore Hous	46.00	FA 18 Spouse O	0.00	0.30	0	14	14	0.4
	Zone 102 Subtotal					0	14	14	0.4
103	Lemoore Main	191.00	FA 18 Spouse O	0.00	0.30	0	57	57	1.7
	Zone 103 Subtotal					0	57	57	1.7
201	Pt. Magu #2	212.00	FA 18 Spouses	0.00	0.30	0	64	64	1.9
	Zone 201 Subtotal					0	64	64	1.9
202	Pt. Magu # 1	21.00	FA 18 Spouses	0.00	0.30	0	6	6	0.2
	Zone 202 Subtotal					0	6	6	0.2
203	Pt. Magu #3	191.00	FA 18 Spouses	0.00	0.30	0	57	57	1.7
	Zone 203 Subtotal					0	57	57	1.7
307	NAF El Centr	778.00	FA 18 Spouses	0.00	0.30	0	233	233	7.0
	Zone 307 Subtotal					0	233	233	7.0
TOTAL						0	484	484	14.5

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AM Existing + FA18 Fri Oct 17, 1997 17:06:30 Page 4-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	251.00	FA 18 Personne	1.00	0.03	251	8	259	7.8
	Zone 101 Subtotal					251	8	259	7.8
102	Lemoore Hous	64.00	FA 18 Personne	1.00	0.03	64	2	66	2.0
	Zone 102 Subtotal					64	2	66	2.0
103	Lemoore Main	269.00	FA 18 Personne	1.00	0.03	269	8	277	8.3
	Zone 103 Subtotal					269	8	277	8.3
201	Pt. Magu #2	264.00	FA 18 Personne	1.00	0.03	264	8	272	8.2
	Zone 201 Subtotal					264	8	272	8.2
202	Pt. Magu # 1	26.00	FA 18 Personne	1.00	0.03	26	1	27	0.8
	Zone 202 Subtotal					26	1	27	0.8
203	Pt. Magu #3	238.00	FA 18 Personne	1.00	0.03	238	7	245	7.3
	Zone 203 Subtotal					238	7	245	7.3
307	NAF El Centr	1067.00	FA 18 Personne	1.00	0.03	1067	32	1099	33.0
	Zone 307 Subtotal					1067	32	1099	33.0
TOTAL						2179	66	2245	67.3

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

AM Existing + FA18 Fri Oct 17, 1997 17:06:30 Page 5-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Support Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	52.00	FA 18 Support	1.00	0.03	52	2	54	1.6
	Zone 101 Subtotal					52	2	54	1.6
102	Lemoore Hous	13.00	FA 18 Support	1.00	0.03	13	0	13	0.4
	Zone 102 Subtotal					13	0	13	0.4
103	Lemoore Main	55.00	FA 18 Support	1.00	0.03	55	2	57	1.7
	Zone 103 Subtotal					55	2	57	1.7
201	Pt. Magu #2	60.00	FA 18 Support	1.00	0.03	60	2	62	1.9
	Zone 201 Subtotal					60	2	62	1.9
202	Pt. Magu # 1	6.00	FA 18 Support	1.00	0.03	6	0	6	0.2
	Zone 202 Subtotal					6	0	6	0.2
203	Pt. Magu #3	54.00	FA 18 Support	1.00	0.03	54	2	56	1.7
	Zone 203 Subtotal					54	2	56	1.7
307	NAF El Centr	200.00	FA 18 Support	1.00	0.03	200	6	206	6.2
	Zone 307 Subtotal					200	6	206	6.2
TOTAL						440	14	454	13.6

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AM Existing + FA18 Fri Oct 17, 1997 17:06:30 Page 6-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Distribution Report

Percent Of Trips E2 Default

Zone	To Gates 1	2	3	4	5	6	7	8	9	10	11
101	23.0	47.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	89.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	92.0	0.0	6.0	2.0	0.0	0.0	0.0	0.0	0.0
201	0.0	0.0	0.0	0.0	0.0	0.0	59.0	11.0	24.0	4.0	0.0
202	0.0	0.0	0.0	0.0	0.0	0.0	80.0	12.0	8.0	0.0	0.0
203	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	68.0	7.0	0.0
307	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0

Zone	To Gates 12	13	14	15	16	17	18
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0
201	0.0	0.0	0.0	0.0	0.0	0.0	2.0
202	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203	0.0	0.0	0.0	0.0	0.0	0.0	0.0
307	3.0	3.0	20.0	13.0	45.0	7.0	0.0

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

AM Existing + FA18 Fri Oct 17, 1997 17:06:30 Page 7-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Turning Movement Report
M Personnel On-Base + AM Spouses/Dependants On-Base + AM Personne

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#38													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	298	0	0	0	0	0	0	0	298
Total	0	0	0	0	298	0	0	0	0	0	0	0	298
#40													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	74	0	0	0	0	0	0	0	0	0	0	74
Total	0	74	0	0	0	0	0	0	0	0	0	0	74
#44													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	19	13	0	0	0	0	0	0	0	0	55	87
Total	0	19	13	0	0	0	0	0	0	0	0	55	87
#53													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	41	10	0	0	0	0	0	51
Total	0	0	0	0	0	41	10	0	0	0	0	0	51
#55													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	3	75	0	0	0	0	0	0	78
Total	0	0	0	0	3	75	0	0	0	0	0	0	78
#101 Jackson & Main Gate													
Base	2	6	4	43	6	7	4	65	2	10	142	726	1017
Added	0	0	0	74	0	2	7	0	0	0	0	326	409
Total	2	6	4	117	6	9	11	65	2	10	142	1052	1426
#102 SR 198 WB Ramps & Avenal Cut-Off													
Base	13	11	0	0	164	2	0	0	0	109	0	291	590
Added	20	9	0	0	18	0	0	0	0	0	0	70	117
Total	33	20	0	0	182	2	0	0	0	109	0	361	707
#103 SR 198 EB Ramps & Avenal Cut-Off													
Base	57	3	3	3	261	55	1	5	1	6	4	25	424
Added	0	29	0	0	2	16	0	0	5	0	0	0	52
Total	57	32	3	3	263	71	1	5	6	6	4	25	476
#104 SR 41 & Grangeville													
Base	261	178	13	9	230	51	61	39	14	10	254	24	1144
Added	94	0	0	0	0	72	17	34	22	0	147	0	386
Total	355	178	13	9	230	123	78	73	36	10	401	24	1530

AM Existing + FA18 Fri Oct 17, 1997 17:06:30 Page 7-2

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#201 Navalair & SR 1 SB Ramps													
Base	0	42	2	2	16	0	0	0	0	30	0	1	93
Added	0	2	3	0	7	0	0	0	0	223	0	0	235
Total	0	44	5	2	23	0	0	0	0	253	0	1	328
#202 Navalair & Wood													
Base	0	40	78	6	40	0	0	0	0	17	0	5	186
Added	0	5	65	0	230	0	0	0	0	54	0	0	354
Total	0	45	143	6	270	0	0	0	0	71	0	5	540
#203 N. Mugu & Frontage													
Base	14	29	0	0	38	213	91	0	12	0	0	0	397
Added	80	7	0	0	30	253	63	0	20	0	0	0	453
Total	94	36	0	0	68	466	154	0	32	0	0	0	850
#204 Main & Frontage													
Base	13	5	0	0	13	13	38	0	15	0	0	0	97
Added	3	80	0	0	20	30	7	0	1	0	0	0	141
Total	16	85	0	0	33	43	45	0	16	0	0	0	238
#205 Las Posas & SR 1 NB Off Ramp													
Base	21	0	36	0	0	0	0	41	0	0	328	0	426
Added	21	0	0	0	0	0	0	71	19	0	287	0	398
Total	42	0	36	0	0	0	0	112	19	0	615	0	824
#301 Evan Hewes & Drew													
Base	123	14	23	14	22	7	7	35	39	23	104	6	417
Added	0	0	39	39	0	0	0	117	0	9	28	9	241
Total	123	14	62	53	22	7	7	152	39	32	132	15	658
#302 Evan Hewes & Bennett													
Base	0	27	0	25	10	11	17	90	1	0	131	85	397
Added	0	261	0	201	62	46	196	0	0	0	0	848	1614
Total	0	288	0	226	72	57	213	90	1	0	131	933	2011
#303 Evan Hewes & Forrester													
Base	15	65	11	30	107	38	22	156	17	104	110	12	687
Added	91	0	0	0	0	170	40	139	22	0	587	0	1049
Total	106	65	11	30	107	208	62	295	39	104	697	12	1736
#401 Alameda & First													
Base	472	0	16	0	0	0	0	69	32	32	769	0	1390
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	472	0	16	0	0	0	0	69	32	32	769	0	1390
#402 Alameda & Third													
Base	0	0	0	0	85	0	0	0	0	2184	0	1049	3318
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	85	0	0	0	0	2184	0	1049	3318

Table D-1
Traffic Impact Analysis: Existing AM and PM + F/A-18E/F Traffic *(continued)*

AM Existing + FA18   Fri Oct 17, 1997 17:06:30   Page 7-3

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#403 Alameda & Fourth													
Base	488	0	69	95	32	2099	0	334	48	0	0	0	3165
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	488	0	69	95	32	2099	0	334	48	0	0	0	3165
#404 Orange & First													
Base	424	0	42	0	0	0	0	16	90	58	487	0	1117
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	424	0	42	0	0	0	0	16	90	58	487	0	1117
#405 Orange & Third													
Base	164	217	0	0	345	21	0	0	0	1256	2957	260	5220
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	164	217	0	0	345	21	0	0	0	1256	2957	260	5220
#406 Orange & Fourth													
Base	0	355	302	339	1288	0	32	731	64	0	0	0	3111
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	355	302	339	1288	0	32	731	64	0	0	0	3111
#407 Orange & R.H. Dana Place													
Base	9	17	110	9	11	18	14	1205	36	478	805	20	2732
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9	17	110	9	11	18	14	1205	36	478	805	20	2732

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AM Existing + FA18   Fri Oct 17, 1997 17:06:30   Page 8-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
#101 Jackson & Main Gate	A	5.0	0.140	C	17.1	0.200	+12.110 D/V
#102 SR 198 WB Ramps & Avenal Cut-O	B	2.8	0.000	B	3.1	0.000	+ 0.000 V/C
#103 SR 198 EB Ramps & Avenal Cut-O	B	1.0	0.000	B	1.0	0.000	+ 0.000 V/C
#104 SR 41 & Grangeville	B	13.6	0.445	C	16.3	0.699	+ 2.712 D/V
#301 Evan Hewes & Drew	A	2.9	0.350	B	6.8	0.683	+ 0.333 V/C
#302 Evan Hewes & Bennett	A	2.5	0.351	F	OVRFL	3.799	+ 3.448 V/C
#303 Evan Hewes & Forrester	A	4.9	0.649	F	646.4	2.116	+ 1.467 V/C

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

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AM Existing + FA18          Fri Oct 17, 1997 17:06:30                     Page 9-1
------------------------------------------------------------------------------
                           Traffic Impact Analysis
                         F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             1994 HCM Operations Method (Base Volume Alternative)
******************************************************************************
Intersection #101 Jackson & Main Gate
******************************************************************************
Cycle (sec):          80              Critical Vol./Cap. (X):         0.140
Loss Time (sec):      12 (Y+R =  3 sec) Average Delay (sec/veh):        5.0
Optimal Cycle:        77              Level Of Service:                   A
******************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:           Include          Include          Include            Ovl
Min. Green:     3    3     3     4    4     4     3   53    53     5   55    55
Lanes:         0  1  0  0  1    1  0  0  1  1    1  0  1  0  1    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    6     4    43    6     7     4   65     2    10  142   726
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    2    6     4    43    6     7     4   65     2    10  142   726
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     2    7     4    48    7     8     4   72     2    11  158   807
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    2    7     4    48    7     8     4   72     2    11  158   807
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.05  1.05  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     2    7     4    48    7     8     4   72     2    11  158   807
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.97 0.97  0.83  0.93 0.90  0.90  0.93 0.98  0.83  0.93 0.98  0.83
Lanes:       0.22 0.78  1.00  1.00 0.93  1.07  1.00 1.00  1.00  1.00 1.00  1.00
Final Sat.:   410 1434  1583  1770 1599  1828  1770 1863  1583  1770 1863  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.00  0.03 0.00  0.00  0.00 0.04  0.00  0.01 0.08  0.51
Crit Moves:       ****        ****             ****                  ****
Green/Cycle: 0.04 0.04  0.04  0.09 0.09  0.09  0.04 0.66  0.66  0.06 0.69  0.78
Volume/Cap:  0.13 0.13  0.07  0.31 0.05  0.05  0.06 0.06  0.00  0.10 0.12  0.66
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   24.1 24.1  24.0  22.5 21.6  21.6  24.0  3.1   2.9  22.9  2.8   3.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.1 24.1  24.0  22.5 21.6  21.6  24.0  3.1   2.9  22.9  2.8   3.6
Queue:          0    0     0     1    0     0     0    1     0     0    1     9
******************************************************************************

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AM Existing + FA18          Fri Oct 17, 1997 17:06:30                     Page 10-1
------------------------------------------------------------------------------
                           Traffic Impact Analysis
                         F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #101 Jackson & Main Gate
******************************************************************************
Cycle (sec):          80              Critical Vol./Cap. (X):         0.200
Loss Time (sec):      12 (Y+R =  3 sec) Average Delay (sec/veh):       17.1
Optimal Cycle:        77              Level Of Service:                   C
******************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:           Include          Include          Include            Ovl
Min. Green:     3    3     3     4    4     4     3   53    53     5   55    55
Lanes:         0  1  0  0  1    1  0  0  1  1    1  0  1  0  1    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    6     4    43    6     7     4   65     2    10  142   726
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    2    6     4    43    6     7     4   65     2    10  142   726
Added Vol:      0    0     0    74    0     2     7    0     0     0    0   326
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    2    6     4   117    6     9    11   65     2    10  142  1052
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     2    7     4   130    7    10    12   72     2    11  158  1169
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    2    7     4   130    7    10    12   72     2    11  158  1169
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.05  1.05  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     2    7     4   130    7    11    12   72     2    11  158  1169
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.97 0.97  0.83  0.93 0.89  0.89  0.93 0.98  0.83  0.93 0.98  0.83
Lanes:       0.22 0.78  1.00  1.00 0.78  1.22  1.00 1.00  1.00  1.00 1.00  1.00
Final Sat.:   410 1434  1583  1770 1318  2072  1770 1863  1583  1770 1863  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.00  0.07 0.01  0.01  0.01 0.04  0.00  0.01 0.08  0.74
Crit Moves:       ****        ****             ****                  ****
Green/Cycle: 0.04 0.04  0.04  0.09 0.09  0.09  0.04 0.66  0.66  0.06 0.69  0.78
Volume/Cap:  0.13 0.13  0.07  0.84 0.06  0.06  0.18 0.06  0.00  0.10 0.12  0.95
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   24.1 24.1  24.0  44.6 21.6  21.6  24.2  3.1   2.9  22.9  2.8  16.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.1 24.1  24.0  44.6 21.6  21.6  24.2  3.1   2.9  22.9  2.8  16.6
Queue:          0    0     0     4    0     0     0    1     0     0    1    27
******************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30                Page 11-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
         1994 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):       2.8        Worst Case Level Of Service:      B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:       0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13   11    0     0  164    2     0    0    0   109    0  291
Growth Adj:  1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   13   11    0     0  164    0     0    0    0   109    0  291
User Adj:    1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    14   12    0     0  182    0     0    0    0   121    0  323
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:    14   12    0     0  182    0     0    0    0   121    0  323
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:            0%               0%               0%               0%
% Cycle/Cars:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
% Truck/Comb:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
PCE Adj:     1.10 1.00 1.00  1.10 1.00 1.00  1.10 1.10 1.10  1.10 1.10 1.10
Cycl/Car PCE:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Trck/Cmb PCE:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Adj Vol.:      16   12    0     0  182    0     0    0    0   133    0  356
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx  2.6
Critical Gp:  5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx  5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  182 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   209 xxxx   12
Potent Cap.: 1404 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   801 xxxx 1365
Adj Cap:     1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.99 xxxx 1.00
Move Cap.:   1404 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   792 xxxx 1365
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  2.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   5.4 xxxx  3.5
LOS by Move:    A    *    *     *    *    *     *    *    *     B    *    A
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:        1.5              0.0              0.0              4.0
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```

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30                Page 12-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
        1994 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):       3.1        Worst Case Level Of Service:      B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:       0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13   11    0     0  164    2     0    0    0   109    0  291
Growth Adj:  1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   13   11    0     0  164    0     0    0    0   109    0  291
Added Vol:     20    9    0     0   18    0     0    0    0     0    0   70
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   33   20    0     0  182    0     0    0    0   109    0  361
User Adj:    1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    37   22    0     0  202    0     0    0    0   121    0  401
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:    37   22    0     0  202    0     0    0    0   121    0  401
Adjusted Volume Module:
Grade:            0%               0%               0%               0%
% Cycle/Cars:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
% Truck/Comb:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
PCE Adj:     1.10 1.00 1.00  1.10 1.00 1.00  1.10 1.10 1.10  1.10 1.10 1.10
Cycl/Car PCE:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Trck/Cmb PCE:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Adj Vol.:      40   22    0     0  202    0     0    0    0   133    0  441
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx  2.6
Critical Gp:  5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx  5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  202 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   261 xxxx   22
Potent Cap.: 1373 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   748 xxxx 1349
Adj Cap:     1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.97 xxxx 1.00
Move Cap.:   1373 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   725 xxxx 1349
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  2.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.0 xxxx  3.8
LOS by Move:    A    *    *     *    *    *     *    *    *     B    *    A
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:        1.7              0.0              0.0              4.3
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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30              Page 13-1
-------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
             1994 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
*******************************************************************************
Average Delay (sec/veh):       1.0          Worst Case Level Of Service:      B
*******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:        1  0  1  0  1    1  0  1  0  1    0  1  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      57     3     3     3   261    55     1     5     1     6     4    25
Growth Adj:  1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   57     3     0     3   261     0     1     5     1     6     4    25
User Adj:    1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    63     3     0     3   290     0     1     6     1     7     4    28
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    63     3     0     3   290     0     1     6     1     7     4    28
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:              0%               0%               0%               0%
% Cycle/Cars:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:     1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      70     3     0     4   290     0     1     6     1     7     5    31
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:  2.1  xxxx xxxxx   2.1  xxxx xxxxx   3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:  5.0  xxxx xxxxx   5.0  xxxx xxxxx   6.5   6.0   5.5   6.5   6.0   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  290  xxxx xxxxx     3  xxxx xxxxx   376   360   290   363   360     3
Potent Cap.: 1247  xxxx xxxxx  1708  xxxx xxxxx   641   706   987   652   706  1379
Adj Cap:     1.00  xxxx xxxxx  1.00  xxxx xxxxx  0.93  0.94  1.00  0.95  0.94  1.00
Move Cap.:   1247  xxxx xxxxx  1708  xxxx xxxxx   596   665   987   618   665  1379
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  3.0  xxxx xxxxx   2.1  xxxx xxxxx   6.1   5.5   3.7   5.9   5.4   2.7
LOS by Move:    A     *     *     A     *     *     *     B     A     *     *     A
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   653  xxxx xxxxx   636  xxxx xxxxx
Shrd StpDel:xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   5.6  xxxx xxxxx   5.8  xxxx xxxxx
Shared LOS:     *     *     *     *     *     *     B     *     *     B     *     *
ApproachDel:         2.9              0.0              5.3              3.5
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```

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30              Page 14-1
-------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
             1994 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
*******************************************************************************
Average Delay (sec/veh):       1.0          Worst Case Level Of Service:      B
*******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:        1  0  1  0  1    1  0  1  0  1    0  1  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      57     3     3     3   261    55     1     5     1     6     4    25
Growth Adj:  1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   57     3     0     3   261     0     1     5     1     6     4    25
Added Vol:      0    29     0     0     2    16     0     0     5     0     0     0
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   57    32     0     3   263     0     1     5     6     6     4    25
User Adj:    1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    63    36     0     3   292     0     1     6     7     7     4    28
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    63    36     0     3   292     0     1     6     7     7     4    28
Adjusted Volume Module:
Grade:              0%               0%               0%               0%
% Cycle/Cars:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:     1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      70    36     0     4   292     0     1     6     7     7     5    31
Critical Gap Module:
MoveUp Time:  2.1  xxxx xxxxx   2.1  xxxx xxxxx   3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:  5.0  xxxx xxxxx   5.0  xxxx xxxxx   6.5   6.0   5.5   6.5   6.0   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  292  xxxx xxxxx    36  xxxx xxxxx   411   394   292   401   394    36
Potent Cap.: 1244  xxxx xxxxx  1649  xxxx xxxxx   612   677   985   621   677  1328
Adj Cap:     1.00  xxxx xxxxx  1.00  xxxx xxxxx  0.93  0.94  1.00  0.94  0.94  1.00
Move Cap.:   1244  xxxx xxxxx  1649  xxxx xxxxx   569   638   985   584   638  1328
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  3.0  xxxx xxxxx   2.2  xxxx xxxxx   6.3   5.7   3.7   6.2   5.7   2.8
LOS by Move:    A     *     *     A     *     *     *     B     A     *     *     A
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   625  xxxx xxxxx   605  xxxx xxxxx
Shrd StpDel:xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   5.8  xxxx xxxxx   6.1  xxxx xxxxx
Shared LOS:     *     *     *     *     *     *     B     *     *     B     *     *
ApproachDel:         2.0              0.0              4.7              3.7
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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30                   Page 15-1
---------------------------------------------------------------------------------
                             Traffic Impact Analysis
                           F/A-18 E/F Squadron  Siting
---------------------------------------------------------------------------------
                         Level Of Service Computation Report
                1994 HCM Operations Method (Base Volume Alternative)
*********************************************************************************
Intersection #104 SR 41 & Grangeville
*********************************************************************************
Cycle (sec):         80               Critical Vol./Cap. (X):         0.445
Loss Time (sec):      9 (Y+R =  9 sec) Average Delay (sec/veh):        13.6
Optimal Cycle:       31               Level Of Service:                  B
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  2  0  1   1  0  2  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     261  178    13     9  230    51    61   39    14    10  254    24
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  261  178    13     9  230    51    61   39    14    10  254    24
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:   290  198    14    10  256    57    68   43    16    11  282    27
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  290  198    14    10  256    57    68   43    16    11  282    27
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00  1.00 1.05  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   290  208    14    10  268    57    68   43    16    11  282    27
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.98  0.83  0.93 0.98  0.83  0.44 0.44  0.83  0.97 0.97  0.83
Lanes:       1.00 2.00  1.00  1.00 2.00  1.00  0.61 0.39  1.00  0.04 0.96  1.00
Final Sat.:  1770 3725  1583  1770 3725  1583   514  325  1583    69 1775  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.16 0.06  0.01  0.01 0.07  0.04  0.13 0.13  0.01  0.16 0.16  0.02
Crit Moves:  ****                  ****                                ****
Green/Cycle: 0.37 0.48  0.48  0.05 0.16  0.16  0.36 0.36  0.36  0.36 0.36  0.36
Volume/Cap:  0.44 0.12  0.02  0.12 0.44  0.22  0.37 0.37  0.03  0.44 0.44  0.05
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   12.7  7.4   7.0  23.5 19.9  18.9  12.7 12.7  10.8  13.0 13.0  10.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  12.7  7.4   7.0  23.5 19.9  18.9  12.7 12.7  10.8  13.0 13.0  10.9
Queue:          5    3     0     0    5     1     1    1     0     0    5     0
*********************************************************************************

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```

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30                   Page 16-1
---------------------------------------------------------------------------------
                             Traffic Impact Analysis
                           F/A-18 E/F Squadron  Siting
---------------------------------------------------------------------------------
                         Level Of Service Computation Report
               1994 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #104 SR 41 & Grangeville
*********************************************************************************
Cycle (sec):         80               Critical Vol./Cap. (X):         0.699
Loss Time (sec):      9 (Y+R =  9 sec) Average Delay (sec/veh):        16.3
Optimal Cycle:       49               Level Of Service:                  C
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  2  0  1   1  0  2  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     261  178    13     9  230    51    61   39    14    10  254    24
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  261  178    13     9  230    51    61   39    14    10  254    24
Added Vol:     94    0     0     0    0    72    17   34    22     0  147     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  355  178    13     9  230   123    78   73    36    10  401    24
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:   394  198    14    10  256   137    87   81    40    11  446    27
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  394  198    14    10  256   137    87   81    40    11  446    27
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00  1.00 1.05  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   394  208    14    10  268   137    87   81    40    11  446    27
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.98  0.83  0.93 0.98  0.83  0.28 0.28  0.83  0.97 0.97  0.83
Lanes:       1.00 2.00  1.00  1.00 2.00  1.00  0.52 0.48  1.00  0.02 0.98  1.00
Final Sat.:  1770 3725  1583  1770 3725  1583   280  260  1583    44 1800  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.22 0.06  0.01  0.01 0.07  0.09  0.31 0.31  0.03  0.25 0.25  0.02
Crit Moves:  ****                        ****        ****
Green/Cycle: 0.32 0.40  0.40  0.04 0.12  0.12  0.45 0.45  0.45  0.45 0.45  0.45
Volume/Cap:  0.70 0.14  0.02  0.14 0.58  0.70  0.70 0.70  0.06  0.56 0.56  0.04
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   18.1  9.8   9.3  24.0 22.7  28.7  17.4 17.4   8.2  11.2 11.2   8.1
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  18.1  9.8   9.3  24.0 22.7  28.7  17.4 17.4   8.2  11.2 11.2   8.1
Queue:          8    3     0     0    6     3     2    2     1     0    8     0
*********************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30                    Page 17-1
----------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
----------------------------------------------------------------------------------
                     Level Of Service Computation Report
            1994 HCM 4-Way Stop Method (Base Volume Alternative)
**********************************************************************************
Intersection #301 Evan Hewes & Drew
**********************************************************************************
Cycle (sec):          1                 Critical Vol./Cap. (X):         0.350
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):          2.9
Optimal Cycle:        0                 Level Of Service:                  A
**********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:            Include          Include          Include          Include
Lanes:          0  0  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|----------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       123   14    23    14   22     7     7   35    39    23  104     6
Growth Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    123   14    23    14   22     7     7   35    39    23  104     6
User Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:       0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     137   16    26    16   24     8     8   39    43    26  116     7
Reduct Vol:       0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    137   16    26    16   24     8     8   39    43    26  116     7
PCE Adj:       1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:       1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     137   16    26    16   24     8     8   39    43    26  116     7
------------|----------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:       512  512   512   291  291   291   208  208   208   284  284   284
Adjustment:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:         0.77 0.09  0.14  0.33 0.50  0.17  0.18 0.87  0.95  0.35 1.56  0.09
Final Sat.:     392   46    74    97  146    49    37  180   199    99  442    27
------------|----------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:       0.35 0.35  0.35  0.16 0.16  0.16  0.22 0.22  0.22  0.26 0.26  0.26
Crit Moves:               ****       ****             ****             ****
ApproachV/S:        0.35             0.16             0.22             0.26
------------|----------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:      3.8  3.8   3.8   1.9  1.9   1.9   2.3  2.3   2.3   2.7  2.7   2.7
Delay Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:     3.8  3.8   3.8   1.9  1.9   1.9   2.3  2.3   2.3   2.7  2.7   2.7
LOS by Move:      A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:         3.8              1.9              2.3              2.7
LOS by Appr:           A                A                A                A
**********************************************************************************

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```

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:30                    Page 18-1
----------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
----------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Future Volume Alternative)
**********************************************************************************
Intersection #301 Evan Hewes & Drew
**********************************************************************************
Cycle (sec):          1                 Critical Vol./Cap. (X):         0.683
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):          6.8
Optimal Cycle:        0                 Level Of Service:                  B
**********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:            Include          Include          Include          Include
Lanes:          0  0  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|----------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       123   14    23    14   22     7     7   35    39    23  104     6
Growth Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    123   14    23    14   22     7     7   35    39    23  104     6
Added Vol:        0    0    39    39    0     0     0  117     0     9   28     9
PasserByVol:      0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    123   14    62    53   22     7     7  152    39    32  132    15
User Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:       0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     137   16    69    59   24     8     8  169    43    36  147    17
Reduct Vol:       0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    137   16    69    59   24     8     8  169    43    36  147    17
PCE Adj:       1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:       1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     137   16    69    59   24     8     8  169    43    36  147    17
------------|----------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:       325  325   325   325  325   325   270  270   270   299  299   299
Adjustment:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:         0.62 0.07  0.31  0.65 0.26  0.09  0.07 1.54  0.39  0.36 1.47  0.17
Final Sat.:     201   23   101   211   86    29    20  415   106   108  440    51
------------|----------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:       0.68 0.68  0.68  0.28 0.28  0.28  0.41 0.41  0.41  0.33 0.33  0.33
Crit Moves:         ****                  ****             ****        ****
ApproachV/S:        0.68             0.28             0.41             0.33
------------|----------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:     13.4 13.4  13.4   2.9  2.9   2.9   4.7  4.7   4.7   3.6  3.6   3.6
Delay Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:    13.4 13.4  13.4   2.9  2.9   2.9   4.7  4.7   4.7   3.6  3.6   3.6
LOS by Move:      C    C     C     A    A     A     A    A     A     A    A     A
ApproachDel:        13.4              2.9              4.7              3.6
LOS by Appr:           C                A                A                A
**********************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM + F/A-18E/F Traffic *(continued)*

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:31                 Page 19-1
--------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
        1994 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #302 Evan Hewes & Bennett
********************************************************************************
Cycle (sec):         1               Critical Vol./Cap. (X):         0.351
Loss Time (sec):     0 (Y+R =  4 sec) Average Delay (sec/veh):         2.5
Optimal Cycle:       0               Level Of Service:                  A
********************************************************************************
Approach:     North Bound     South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign       Stop Sign        Stop Sign        Stop Sign
Rights:         Include         Include          Include          Include
Lanes:       0  0  1  0  0   0  1  0  0  1   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0   27     0    25   10    11    17   90     1     0  131    85
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0   27     0    25   10    11    17   90     1     0  131    85
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:    0   30     0    28   11    12    19  100     1     0  146    94
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   0   30     0    28   11    12    19  100     1     0  146    94
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    0   30     0    28   11    12    19  100     1     0  146    94
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     98   98    98   264  264   264   437  437   437   416  416   416
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  0.00  0.72 0.28  1.00  1.00 0.99  0.01  0.00 1.00  1.00
Final Sat.:    0   98     0   190   74   264   437  433     4     0  416   416
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.31  0.00  0.15 0.15  0.05  0.04 0.23  0.23  0.00 0.35  0.23
Crit Moves:       ****             ****              ****              ****
ApproachV/S:      0.31             0.10              0.14              0.29
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    0.0  3.2   0.0   1.8  1.8   1.2   1.2  2.4   2.4   0.0  3.8   2.4
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  3.2   0.0   1.8  1.8   1.2   1.2  2.4   2.4   0.0  3.8   2.4
LOS by Move:   *    A     *     A    A     A     A    A     A     *    A     A
ApproachDel:       3.2              1.4               1.7               3.0
LOS by Appr:        A                A                 A                 A
********************************************************************************

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```

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:31                 Page 20-1
--------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
       1994 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #302 Evan Hewes & Bennett
********************************************************************************
Cycle (sec):         1               Critical Vol./Cap. (X):         3.799
Loss Time (sec):     0 (Y+R =  4 sec) Average Delay (sec/veh):       2008.4
Optimal Cycle:       0               Level Of Service:                  F
********************************************************************************
Approach:     North Bound     South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign       Stop Sign        Stop Sign        Stop Sign
Rights:         Include         Include          Include          Include
Lanes:       0  0  1  0  0   0  1  0  0  1   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0   27     0    25   10    11    17   90     1     0  131    85
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0   27     0    25   10    11    17   90     1     0  131    85
Added Vol:     0  261     0   201   62    46   196    0     0     0    0   848
PasserByVol:   0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   0  288     0   226   72    57   213   90     1     0  131   933
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:    0  320     0   251   80    63   237  100     1     0  146  1037
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   0  320     0   251   80    63   237  100     1     0  146  1037
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    0  320     0   251   80    63   237  100     1     0  146  1037
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    266  266   266   367  367   367   409  409   409   273  273   273
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  0.00  0.76 0.24  1.00  1.00 0.99  0.01  0.00 1.00  1.00
Final Sat.:    0  266     0   278   89   367   409  405     4     0  273   273
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 1.20  0.00  0.90 0.90  0.17  0.58 0.25  0.25  0.00 0.53  3.80
Crit Moves:       ****        ****              ****                        ****
ApproachV/S:      1.20             0.54              0.41              2.17
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    0.0 96.7   0.0  30.8 30.8   1.9   9.0  2.6   2.6   0.0  7.6 xxxxx
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 96.7   0.0  30.8 30.8   1.9   9.0  2.6   2.6   0.0  7.6 xxxxx
LOS by Move:   *    F     *     E    E     A     B    A     A     *    B     F
ApproachDel:      96.7              7.7               4.8            3764.4
LOS by Appr:        F                B                 A                 F
********************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:31                Page 21-1
-------------------------------------------------------------------------------
                            Traffic Impact Analysis
                          F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                        Level Of Service Computation Report
              1994 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #303 Evan Hewes & Forrester
*******************************************************************************
Cycle (sec):          1              Critical Vol./Cap. (X):        0.649
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):       4.9
Optimal Cycle:        0              Level Of Service:                  A
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      15   65    11    30  107    38    22  156    17   104  110    12
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   15   65    11    30  107    38    22  156    17   104  110    12
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:    17   72    12    33  119    42    24  173    19   116  122    13
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   17   72    12    33  119    42    24  173    19   116  122    13
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    17   72    12    33  119    42    24  173    19   116  122    13
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     334  334   334   353  353   353   296  296   296   358  358   358
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.17 0.71  0.12  0.17 0.61  0.22  1.00 0.90  0.10  1.00 0.90  0.10
Final Sat.:    56  238    40    60  217    76   296  267    29   358  324    34
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.30 0.30  0.30  0.55 0.55  0.55  0.08 0.65  0.65  0.32 0.38  0.38
Crit Moves:       ****              ****            ****              ****
ApproachV/S:      0.30              0.55             0.36             0.35
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    3.2  3.2   3.2   8.1  8.1   8.1   1.4 11.8  11.8   3.4  4.2   4.2
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   3.2  3.2   3.2   8.1  8.1   8.1   1.4 11.8  11.8   3.4  4.2   4.2
LOS by Move:    A    A     A     B    B     B     A    C     C     A    A     A
ApproachDel:       3.2               8.1              4.0              3.8
LOS by Appr:        A                 B                A                A
*******************************************************************************

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```

```
AM Existing + FA18          Fri Oct 17, 1997 17:06:31                Page 22-1
-------------------------------------------------------------------------------
                            Traffic Impact Analysis
                          F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                        Level Of Service Computation Report
             1994 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #303 Evan Hewes & Forrester
*******************************************************************************
Cycle (sec):          1              Critical Vol./Cap. (X):        2.116
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):     646.4
Optimal Cycle:        0              Level Of Service:                  F
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      15   65    11    30  107    38    22  156    17   104  110    12
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   15   65    11    30  107    38    22  156    17   104  110    12
Added Vol:     91    0     0     0    0   170    40  139    22     0  587     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  106   65    11    30  107   208    62  295    39   104  697    12
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:   118   72    12    33  119   231    69  328    43   116  774    13
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  118   72    12    33  119   231    69  328    43   116  774    13
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   118   72    12    33  119   231    69  328    43   116  774    13
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     410  410   410   181  181   181   384  384   384   424  424   424
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.58 0.36  0.06  0.09 0.31  0.60  1.00 0.88  0.12  1.00 0.98  0.02
Final Sat.:   240  146    24    16   56   109   384  339    45   424  417     7
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.49 0.49  0.49  2.12 2.12  2.12  0.18 0.97  0.97  0.27 1.86  1.86
Crit Moves:       ****              ****            ****                    ****
ApproachV/S:      0.49              2.12             0.57             1.06
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    6.5  6.5   6.5  3105 3105  3105   2.0 39.3  39.3   2.8 1157  1157
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   6.5  6.5   6.5  3105 3105  3105   2.0 39.3  39.3   2.8 1157  1157
LOS by Move:    B    B     B     F    F     F     A    E     E     A    F     F
ApproachDel:       6.5            3105.4              8.8             57.2
LOS by Appr:        B                 F                B                F
*******************************************************************************

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 1-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Scenario Report

Scenario:	PM Existing + FA18
Command:	Default
Volume:	Existing PM
Geometry:	PM Existing
Impact Fee:	Default Impact Fee
Trip Generation:	PM FA-18
Trip Distribution:	E2 Default
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 2-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Personnel On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	433.00	FA 18 Personne	0.04	0.04	17	17	34	1.0
	Zone 101	Subtotal				17	17	34	1.0
102	Lemoore Hous	111.00	FA 18 Personne	0.04	0.04	4	4	8	0.2
	Zone 102	Subtotal				4	4	8	0.2
103	Lemoore Main	464.00	FA 18 Personne	0.04	0.04	19	19	38	1.1
	Zone 103	Subtotal				19	19	38	1.1
201	Pt. Magu #2	452.00	FA 18 Personne	0.04	0.04	18	18	36	1.0
	Zone 201	Subtotal				18	18	36	1.0
202	Pt. Magu # 1	45.00	FA 18 Personne	0.04	0.04	2	2	4	0.1
	Zone 202	Subtotal				2	2	4	0.1
203	Pt. Magu #3	407.00	FA 18 Personne	0.04	0.04	16	16	32	0.9
	Zone 203	Subtotal				16	16	32	0.9
307	NAF El Centr	1890.00	FA 18 Personne	0.04	0.04	76	76	152	4.4
	Zone 307	Subtotal				76	76	152	4.4
TOTAL						152	152	304	8.7

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 3-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Spouses/Dependants On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	178.00	FA 18 Spouse O	0.30	0.00	53	0	53	1.5
	Zone 101 Subtotal					53	0	53	1.5
102	Lemoore Hous	46.00	FA 18 Spouse O	0.30	0.00	14	0	14	0.4
	Zone 102 Subtotal					14	0	14	0.4
103	Lemoore Main	191.00	FA 18 Spouse O	0.30	0.00	57	0	57	1.6
	Zone 103 Subtotal					57	0	57	1.6
201	Pt. Magu #2	212.00	FA 18 Spouses	0.30	0.00	64	0	64	1.8
	Zone 201 Subtotal					64	0	64	1.8
202	Pt. Magu # 1	21.00	FA 18 Spouses	0.30	0.00	6	0	6	0.2
	Zone 202 Subtotal					6	0	6	0.2
203	Pt. Magu #3	191.00	FA 18 Spouses	0.30	0.00	57	0	57	1.6
	Zone 203 Subtotal					57	0	57	1.6
307	NAF El Centr	778.00	FA 18 Spouses	0.30	0.00	233	0	233	6.7
	Zone 307 Subtotal					233	0	233	6.7
TOTAL						484	0	484	13.9

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PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 4-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	251.00	FA 18 Personne	0.03	1.00	8	251	259	7.4
	Zone 101 Subtotal					8	251	259	7.4
102	Lemoore Hous	64.00	FA 18 Personne	0.03	1.00	2	64	66	1.9
	Zone 102 Subtotal					2	64	66	1.9
103	Lemoore Main	269.00	FA 18 Personne	0.03	1.00	8	269	277	7.9
	Zone 103 Subtotal					8	269	277	7.9
201	Pt. Magu #2	264.00	FA 18 Personne	0.03	1.00	8	264	272	7.8
	Zone 201 Subtotal					8	264	272	7.8
202	Pt. Magu # 1	26.00	FA 18 Personne	0.03	1.00	1	26	27	0.8
	Zone 202 Subtotal					1	26	27	0.8
203	Pt. Magu #3	238.00	FA 18 Personne	0.03	1.00	7	238	245	7.0
	Zone 203 Subtotal					7	238	245	7.0
307	NAF El Centr	1067.00	FA 18 Personne	0.03	1.00	32	1067	1099	31.5
	Zone 307 Subtotal					32	1067	1099	31.5
TOTAL						66	2179	2245	64.4

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 5-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Support Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	52.00	FA 18 Support	0.03	1.00	2	52	54	1.5
	Zone 101	Subtotal				2	52	54	1.5
102	Lemoore Hous	13.00	FA 18 Support	0.03	1.00	0	13	13	0.4
	Zone 102	Subtotal				0	13	13	0.4
103	Lemoore Main	55.00	FA 18 Support	0.03	1.00	2	55	57	1.6
	Zone 103	Subtotal				2	55	57	1.6
201	Pt. Magu #2	60.00	FA 18 Support	0.03	1.00	2	60	62	1.8
	Zone 201	Subtotal				2	60	62	1.8
202	Pt. Magu # 1	6.00	FA 18 Support	0.03	1.00	0	6	6	0.2
	Zone 202	Subtotal				0	6	6	0.2
203	Pt. Magu #3	54.00	FA 18 Support	0.03	1.00	2	54	56	1.6
	Zone 203	Subtotal				2	54	56	1.6
307	NAF El Centr	200.00	FA 18 Support	0.03	1.00	6	200	206	5.9
	Zone 307	Subtotal				6	200	206	5.9
TOTAL						14	440	454	13.0

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PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 6-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Distribution Report

Percent Of Trips E2 Default

	To Gates										
Zone	1	2	3	4	5	6	7	8	9	10	11
101	23.0	47.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	89.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	92.0	0.0	6.0	2.0	0.0	0.0	0.0	0.0	0.0
201	0.0	0.0	0.0	0.0	0.0	0.0	59.0	11.0	24.0	4.0	0.0
202	0.0	0.0	0.0	0.0	0.0	0.0	80.0	12.0	8.0	0.0	0.0
203	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	68.0	7.0	0.0
307	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0

	To Gates						
Zone	12	13	14	15	16	17	18
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0
201	0.0	0.0	0.0	0.0	0.0	0.0	2.0
202	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203	0.0	0.0	0.0	0.0	0.0	0.0	0.0
307	3.0	3.0	20.0	13.0	45.0	7.0	0.0

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 7-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Turning Movement Report
M Personnel On-Base + PM Spouses/Dependants On-Base + PM Personnel Off-Base + P

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#38													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	82	0	0	0	0	0	0	0	82
Total	0	0	0	0	82	0	0	0	0	0	0	0	82
#40													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	306	0	0	0	0	0	0	0	0	0	0	306
Total	0	306	0	0	0	0	0	0	0	0	0	0	306
#44													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	77	4	0	0	0	0	0	0	0	0	229	310
Total	0	77	4	0	0	0	0	0	0	0	0	229	310
#53													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	11	42	0	0	0	0	0	53
Total	0	0	0	0	0	11	42	0	0	0	0	0	53
#55													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	14	21	0	0	0	0	0	0	35
Total	0	0	0	0	14	21	0	0	0	0	0	0	35
#101 Jackson & Main Gate													
Base	3	6	4	529	6	10	5	184	2	2	131	116	998
Added	0	0	0	336	0	7	2	0	0	0	0	84	429
Total	3	6	4	865	6	17	7	184	2	2	131	200	1427
#102 SR 198 WB Ramps & Avenal Cut-Off													
Base	9	6	0	0	322	3	0	0	0	72	0	165	577
Added	5	2	0	0	81	0	0	0	0	0	0	18	106
Total	14	8	0	0	403	3	0	0	0	72	0	183	683
#103 SR 198 EB Ramps & Avenal Cut-Off													
Base	197	1	6	7	76	300	3	16	2	1	1	7	617
Added	0	7	0	0	9	72	0	0	21	0	0	0	109
Total	197	8	6	7	85	372	3	16	23	1	1	7	726
#104 SR 41 & Grangeville													
Base	109	254	21	18	198	33	166	191	31	35	101	16	1173
Added	24	0	0	0	0	18	74	150	96	0	38	0	400
Total	133	254	21	18	198	51	240	341	127	35	139	16	1573

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PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 7-2

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#201 Navalair & SR 1 SB Ramps													
Base	0	180	2	2	84	0	0	0	0	121	0	0	389
Added	0	7	14	0	2	0	0	0	0	61	0	0	84
Total	0	187	16	2	86	0	0	0	0	182	0	0	473
#202 Navalair & Wood													
Base	0	176	377	8	197	0	0	0	0	40	0	6	804
Added	0	21	271	0	63	0	0	0	0	15	0	0	370
Total	0	197	648	8	260	0	0	0	0	55	0	6	1174
#203 N. Mugu & Frontage													
Base	20	70	0	0	24	172	473	0	21	0	0	0	780
Added	22	31	0	0	8	70	260	0	82	0	0	0	473
Total	42	101	0	0	32	242	733	0	103	0	0	0	1253
#204 Main & Frontage													
Base	7	14	0	0	15	25	83	0	28	0	0	0	172
Added	1	22	0	0	82	8	31	0	3	0	0	0	147
Total	8	36	0	0	97	33	114	0	31	0	0	0	319
#205 Las Posas & SR 1 NB Off Ramp													
Base	8	0	130	0	0	0	0	523	0	0	111	0	772
Added	6	0	0	0	0	0	0	294	77	0	79	0	456
Total	14	0	130	0	0	0	0	817	77	0	190	0	1228
#301 Evan Hewes & Drew													
Base	17	30	20	18	19	20	21	131	133	15	43	16	483
Added	0	0	10	10	0	0	0	31	0	40	121	40	252
Total	17	30	30	28	19	20	21	162	133	55	164	56	735
#302 Evan Hewes & Bennett													
Base	1	1	1	116	32	22	7	146	3	1	95	34	459
Added	0	69	0	873	269	201	52	0	0	0	0	226	1690
Total	1	70	1	989	301	223	59	146	3	1	95	260	2149
#303 Evan Hewes & Forrester													
Base	19	90	14	31	151	15	51	193	31	17	115	19	746
Added	24	0	0	0	0	45	175	604	94	0	156	0	1098
Total	43	90	14	31	151	60	226	797	125	17	271	19	1844
#401 Alameda & First													
Base	48	0	27	0	0	0	0	318	233	69	85	0	780
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	48	0	27	0	0	0	0	318	233	69	85	0	780
#402 Alameda & Third													
Base	0	0	0	0	673	0	0	0	0	546	0	191	1410
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	673	0	0	0	0	546	0	191	1410

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Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 7-3

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#403 Alameda & Fourth													
Base	85	0	106	488	249	413	0	1972	318	0	0	0	3631
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	85	0	106	488	249	413	0	1972	318	0	0	0	3631
#404 Orange & First													
Base	117	0	201	0	0	0	0	217	201	228	127	0	1091
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	117	0	201	0	0	0	0	217	201	228	127	0	1091
#405 Orange & Third													
Base	111	403	0	0	615	27	0	0	0	1002	647	80	2885
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	111	403	0	0	615	27	0	0	0	1002	647	80	2885
#406 Orange & Fourth													
Base	0	482	498	376	1166	0	21	2597	85	0	0	0	5225
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	482	498	376	1166	0	21	2597	85	0	0	0	5225
#407 Orange & R.H. Dana Place													
Base	87	63	560	47	38	66	68	1042	74	175	673	41	2934
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	87	63	560	47	38	66	68	1042	74	175	673	41	2934

PM Existing + FA18 Fri Oct 17, 1997 17:07:19 Page 8-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
#101 Jackson & Main Gate	B	12.3	0.344	C	19.4	0.474	+ 7.108 D/V
#102 SR 198 WB Ramps & Avenal Cut-O	B	1.8	0.000	B	1.8	0.000	+ 0.000 V/C
#103 SR 198 EB Ramps & Avenal Cut-O	B	2.3	0.000	B	2.2	0.000	+ 0.000 V/C
#104 SR 41 & Grangeville	B	13.0	0.494	E	43.6	0.775	+30.633 D/V
#301 Evan Hewes & Drew	A	3.0	0.355	A	3.8	0.398	+ 0.043 V/C
#302 Evan Hewes & Bennett	A	2.8	0.527	F	444.3	2.806	+ 2.279 V/C
#303 Evan Hewes & Forrester	A	4.9	0.727	F	136.6	2.195	+ 1.468 V/C

Table D-1
Traffic Impact Analysis: Existing AM and PM + F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18        Mon Oct 20, 1997 15:42:27              Page 9-1
-------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM Operations Method (Base Volume Alternative)
*******************************************************************************
Intersection #101 Jackson & Main Gate
*******************************************************************************
Cycle (sec):         80              Critical Vol./Cap. (X):         0.344
Loss Time (sec):     12 (Y+R =  3 sec) Average Delay (sec/veh):       11.5
Optimal Cycle:       80              Level Of Service:                  B
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase      Protected        Protected
Rights:          Include          Include          Include           Ovl
Min. Green:    2    2    2     25   25   25      4   39   39      2   37   37
Lanes:        0  1  0  0  1   1  1  0  0  1    1  0  1  0  1    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      3    6    4    529    6   10      5  184    2      2  131  116
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:   3    6    4    529    6   10      5  184    2      2  131  116
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:    3    7    4    588    7   11      6  204    2      2  146  129
Reduct Vol:    0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:   3    7    4    588    7   11      6  204    2      2  146  129
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.05 1.05 1.00   1.00 1.00 1.00   1.00 1.05 1.00
Final Vol.:    3    7    4    617    7   11      6  204    2      2  153  129
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900   1900 1900 1900   1900 1900 1900
Adjustment:  0.97 0.97 0.83  0.93 0.93 0.83   0.93 0.98 0.83   0.93 0.98 0.83
Lanes:       0.30 0.70 1.00  1.98 0.02 1.00   1.00 1.00 1.00   1.00 2.00 1.00
Final Sat.:   553 1291 1583  3500   40 1583   1770 1863 1583   1770 3725 1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.01 0.00  0.18 0.18 0.01   0.00 0.11 0.00   0.00 0.04 0.08
Crit Moves:       ****             ****             ****        ****
Green/Cycle: 0.03 0.03 0.03  0.31 0.31 0.31   0.05 0.49 0.49   0.03 0.46 0.77
Volume/Cap:  0.22 0.22 0.10  0.56 0.56 0.02   0.07 0.22 0.00   0.05 0.09 0.11
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   25.1 25.1 24.7  15.3 15.3 12.3   23.4  7.6  6.8   24.6  7.8  1.4
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:  25.1 25.1 24.7  15.3 15.3 12.3   23.4  7.6  6.8   24.6  7.8  1.4
Queue:          0    0    0    12    0    0      0    3    0      0    2    1
*******************************************************************************

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```

```
PM Existing + FA18        Mon Oct 20, 1997 15:42:27              Page 10-1
-------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #101 Jackson & Main Gate
*******************************************************************************
Cycle (sec):         80              Critical Vol./Cap. (X):         0.474
Loss Time (sec):     12 (Y+R =  3 sec) Average Delay (sec/veh):       18.4
Optimal Cycle:       80              Level Of Service:                  C
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase      Protected        Protected
Rights:          Include          Include          Include           Ovl
Min. Green:    2    2    2     25   25   25      4   39   39      2   37   37
Lanes:        0  1  0  0  1   1  1  0  0  1    1  0  1  0  1    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      3    6    4    529    6   10      5  184    2      2  131  116
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:   3    6    4    529    6   10      5  184    2      2  131  116
Added Vol:     0    0    0    336    0    7      2    0    0      0    0   84
PasserByVol:   0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:   3    6    4    865    6   17      7  184    2      2  131  200
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:    3    7    4    961    7   19      8  204    2      2  146  222
Reduct Vol:    0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:   3    7    4    961    7   19      8  204    2      2  146  222
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.05 1.05 1.00   1.00 1.00 1.00   1.00 1.05 1.00
Final Vol.:    3    7    4   1009    7   19      8  204    2      2  153  222
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900   1900 1900 1900   1900 1900 1900
Adjustment:  0.97 0.97 0.83  0.93 0.93 0.83   0.93 0.98 0.83   0.93 0.98 0.83
Lanes:       0.30 0.70 1.00  1.99 0.01 1.00   1.00 1.00 1.00   1.00 2.00 1.00
Final Sat.:   553 1291 1583  3515   24 1583   1770 1863 1583   1770 3725 1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.01 0.00  0.29 0.29 0.01   0.00 0.11 0.00   0.00 0.04 0.14
Crit Moves:       ****             ****             ****        ****
Green/Cycle: 0.03 0.03 0.03  0.31 0.31 0.31   0.05 0.49 0.49   0.03 0.46 0.77
Volume/Cap:  0.22 0.22 0.10  0.92 0.92 0.04   0.09 0.22 0.00   0.05 0.09 0.18
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   25.1 25.1 24.7  25.9 25.9 12.4   23.4  7.6  6.8   24.6  7.8  1.5
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:  25.1 25.1 24.7  25.9 25.9 12.4   23.4  7.6  6.8   24.6  7.8  1.5
Queue:          0    0    0    25    1    0      0    3    0      0    2    1
*******************************************************************************
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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18        Fri Oct 17, 1997 17:07:19             Page 11-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):       1.8          Worst Case Level Of Service:     B
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        9     6     0     0   322     3     0     0     0    72     0   165
Growth Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:     9     6     0     0   322     3     0     0     0    72     0   165
User Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     10     7     0     0   358     3     0     0     0    80     0   183
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:     10     7     0     0   358     3     0     0     0    80     0   183
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:       11     7     0     0   358     3     0     0     0    88     0   202
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:   2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx   2.6
Critical Gp:   5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   361 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   374 xxxx     7
Potent Cap.:  1153 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   643 xxxx  1374
Adj Cap:      1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.99 xxxx  1.00
Move Cap.:    1153 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   637 xxxx  1374
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:   3.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   3.0
LOS by Move:     A    *     *     *    *     *     *    *     *     B    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        2.0              0.0              0.0              4.1
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```

```
PM Existing + FA18        Fri Oct 17, 1997 17:07:19             Page 12-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          1994 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):       1.8          Worst Case Level Of Service:     B
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        9     6     0     0   322     3     0     0     0    72     0   165
Growth Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:     9     6     0     0   322     3     0     0     0    72     0   165
Added Vol:       5     2     0     0    81     0     0     0     0     0     0    18
PasserByVol:     0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    14     8     0     0   403     3     0     0     0    72     0   183
User Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     16     9     0     0   448     3     0     0     0    80     0   203
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:     16     9     0     0   448     3     0     0     0    80     0   203
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:       17     9     0     0   448     3     0     0     0    88     0   224
Critical Gap Module:
MoveUp Time:   2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx   2.6
Critical Gp:   5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   451 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   472 xxxx     9
Potent Cap.:  1045 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   564 xxxx  1370
Adj Cap:      1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.98 xxxx  1.00
Move Cap.:    1045 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   555 xxxx  1370
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:   3.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.6 xxxx   3.1
LOS by Move:     A    *     *     *    *     *     *    *     *     B    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        2.3              0.0              0.0              4.4
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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18          Fri Oct 17, 1997 17:07:19                Page 13-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                      Level Of Service Computation Report
           1994 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):        2.3           Worst Case Level Of Service:   B
******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:            Ignore           Ignore          Include          Include
Lanes:         1  0  1  0  1   1  0  1  0  1   0  1  1  0  1   0  1  0  0  1
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      197     1     6     7    76   300     3    16     2     1     1     7
Growth Adj:   1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   197     1     0     7    76     0     3    16     2     1     1     7
User Adj:     1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    219     1     0     8    84     0     3    18     2     1     1     8
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    219     1     0     8    84     0     3    18     2     1     1     8
------------|----------------||----------------||----------------||----------------|
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:   xxxx  xxxx .     xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      241     1     0     9    84     0     4    20     2     1     1     9
------------|----------------||----------------||----------------||----------------|
Critical Gap Module:
MoveUp Time:   2.1  xxxx xxxxx   2.1  xxxx xxxxx   3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:   5.0  xxxx xxxxx   5.0  xxxx xxxxx   6.5   6.0   5.5   6.5   6.0   5.5
------------|----------------||----------------||----------------||----------------|
Capacity Module:
Cnflict Vol:    84  xxxx xxxxx     1  xxxx xxxxx   317   312    84   322   312     1
Potent Cap.:  1563  xxxx xxxxx  1712  xxxx xxxxx   694   748  1255   689   748  1383
Adj Cap:      1.00  xxxx xxxxx  1.00  xxxx xxxxx  0.87  0.84  1.00  0.86  0.84  1.00
Move Cap.:    1563  xxxx xxxxx  1712  xxxx xxxxx   605   630  1255   590   630  1383
------------|----------------||----------------||----------------||----------------|
Level Of Service Module:
Stopped Del:   2.7  xxxx xxxxx   2.1  xxxx xxxxx   6.0   5.9   2.9   6.1   5.7   2.6
LOS by Move:     A     *     *     A     *     *     *     B     A     *     *     A
Movement:      LT  - LTR  - RT   LT  - LTR  - RT   LT  - LTR  - RT   LT  - LTR  - RT
Shared Cap.:  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   626  xxxx xxxxx   609  xxxx xxxxx
Shrd StpDel: xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   6.0  xxxx xxxxx   5.9  xxxx xxxxx
Shared LOS:      *     *     *     *     *     *     B     *     *     B     *     *
ApproachDel:          2.7              0.2              5.6              3.4

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```

```
PM Existing + FA18          Fri Oct 17, 1997 17:07:19                Page 14-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                      Level Of Service Computation Report
          1994 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):        2.2           Worst Case Level Of Service:   B
******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:            Ignore           Ignore          Include          Include
Lanes:         1  0  1  0  1   1  0  1  0  1   0  1  1  0  1   0  1  0  0  1
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      197     1     6     7    76   300     3    16     2     1     1     7
Growth Adj:   1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   197     1     0     7    76     0     3    16     2     1     1     7
Added Vol:       0     7     0     0     9    72     0     0    21     0     0     0
PasserByVol:     0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   197     8     0     7    85     0     3    16    23     1     1     7
User Adj:     1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    219     9     0     8    94     0     3    18    26     1     1     8
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    219     9     0     8    94     0     3    18    26     1     1     8
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      241     9     0     9    94     0     4    20    28     1     1     9
Critical Gap Module:
MoveUp Time:   2.1  xxxx xxxxx   2.1  xxxx xxxxx   3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:   5.0  xxxx xxxxx   5.0  xxxx xxxxx   6.5   6.0   5.5   6.5   6.0   5.5
------------|----------------||----------------||----------------||----------------|
Capacity Module:
Cnflict Vol:    94  xxxx xxxxx     9  xxxx xxxxx   334   330    94   352   330     9
Potent Cap.:  1546  xxxx xxxxx  1698  xxxx xxxxx   678   732  1240   663   732  1370
Adj Cap:      1.00  xxxx xxxxx  1.00  xxxx xxxxx  0.87  0.84  1.00  0.84  0.84  1.00
Move Cap.:    1546  xxxx xxxxx  1698  xxxx xxxxx   590   615  1240   555   615  1370
------------|----------------||----------------||----------------||----------------|
Level Of Service Module:
Stopped Del:   2.7  xxxx xxxxx   2.1  xxxx xxxxx   6.1   6.0   3.0   6.5   5.9   2.6
LOS by Move:     A     *     *     A     *     *     *     B     A     *     *     A
Movement:      LT  - LTR  - RT   LT  - LTR  - RT   LT  - LTR  - RT   LT  - LTR  - RT
Shared Cap.:  xxxx  xxxx xxxxx  xxxx  xxxx xxxxx   611  xxxx xxxxx   583  xxxx xxxxx
Shrd StpDel: xxxxx  xxxx xxxxx xxxxx  xxxx xxxxx   6.1  xxxx xxxxx   6.2  xxxx xxxxx
Shared LOS:      *     *     *     *     *     *     B     *     *     B     *     *
ApproachDel:          2.6              0.2              4.4              3.4
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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18         Fri Oct 17, 1997 17:07:19              Page 15-1
----------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
----------------------------------------------------------------------------
                    Level Of Service Computation Report
           1994 HCM Operations Method (Base Volume Alternative)
****************************************************************************
Intersection #104 SR 41 & Grangeville
****************************************************************************
Cycle (sec):          80            Critical Vol./Cap. (X):        0.494
Loss Time (sec):       9 (Y+R =  9 sec) Average Delay (sec/veh):    13.0
Optimal Cycle:        77            Level Of Service:                  B
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    18   30    30    3   15    15   35   35    35   35   35    35
Lanes:        1  0  2  0  1   1  0  2  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     109  254    21   18  198    33  166  191    31   35  101    16
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  109  254    21   18  198    33  166  191    31   35  101    16
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:   121  282    23   20  220    37  184  212    34   39  112    18
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  121  282    23   20  220    37  184  212    34   39  112    18
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00 1.00 1.05  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Final Vol.:   121  296    23   20  231    37  184  212    34   39  112    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.98  0.83 0.93 0.98  0.83 0.68 0.68  0.83 0.66 0.66  0.83
Lanes:       1.00 2.00  1.00 1.00 2.00  1.00 0.46 0.54  1.00 0.26 0.74  1.00
Final Sat.:  1770 3725  1583 1770 3725  1583  597  688  1583  322  926  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.07 0.08  0.01 0.01 0.06  0.02 0.31 0.31  0.02 0.12 0.12  0.01
Crit Moves:  ****                 ****             ****
Green/Cycle: 0.23 0.38  0.38 0.04 0.19  0.19 0.48 0.48  0.48 0.48 0.48  0.48
Volume/Cap:  0.30 0.21  0.04 0.30 0.33  0.12 0.65 0.65  0.05 0.25 0.25  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   16.8 11.0  10.2 25.0 18.3  17.5 12.0 12.0   7.3  8.2  8.2   7.2
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  16.8 11.0  10.2 25.0 18.3  17.5 12.0 12.0   7.3  8.2  8.2   7.2
Queue:          2    4     0    0    4     1    3    4     0    1    1     0
****************************************************************************

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```

```
PM Existing + FA18         Fri Oct 17, 1997 17:07:19              Page 16-1
----------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
----------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
****************************************************************************
Intersection #104 SR 41 & Grangeville
****************************************************************************
Cycle (sec):          80            Critical Vol./Cap. (X):        0.775
Loss Time (sec):       9 (Y+R =  9 sec) Average Delay (sec/veh):    43.6
Optimal Cycle:        77            Level Of Service:                  E
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    18   30    30    3   15    15   35   35    35   35   35    35
Lanes:        1  0  2  0  1   1  0  2  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     109  254    21   18  198    33  166  191    31   35  101    16
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  109  254    21   18  198    33  166  191    31   35  101    16
Added Vol:     24    0     0    0    0    18   74  150    96    0   38     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  133  254    21   18  198    51  240  341   127   35  139    16
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:   148  282    23   20  220    57  267  379   141   39  154    18
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  148  282    23   20  220    57  267  379   141   39  154    18
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00 1.00 1.05  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Final Vol.:   148  296    23   20  231    57  267  379   141   39  154    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.98  0.83 0.93 0.98  0.83 0.63 0.63  0.83 0.44 0.44  0.83
Lanes:       1.00 2.00  1.00 1.00 2.00  1.00 0.41 0.59  1.00 0.20 0.80  1.00
Final Sat.:  1770 3725  1583 1770 3725  1583  493  699  1583  169  669  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.08 0.08  0.01 0.01 0.06  0.04 0.54 0.54  0.09 0.23 0.23  0.01
Crit Moves:  ****                 ****             ****
Green/Cycle: 0.23 0.38  0.38 0.04 0.19  0.19 0.48 0.48  0.48 0.48 0.48  0.48
Volume/Cap:  0.37 0.21  0.04 0.30 0.33  0.19 1.14 1.14  0.19 0.48 0.48  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   17.2 11.0  10.2 25.0 18.3  17.7 96.6 96.6   7.8 10.0 10.0   7.2
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  17.2 11.0  10.2 25.0 18.3  17.7 96.6 96.6   7.8 10.0 10.0   7.2
Queue:          3    4     0    0    4     1   15   21     2    1    2     0
****************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM + F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18          Fri Oct 17, 1997 17:07:19               Page 17-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #301 Evan Hewes & Drew
******************************************************************************
Cycle (sec):            1               Critical Vol./Cap. (X):        0.355
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):        3.0
Optimal Cycle:          0               Level Of Service:                 A
******************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17    30    20    18    19    20    21   131   133    15    43    16
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   17    30    20    18    19    20    21   131   133    15    43    16
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    19    33    22    20    21    22    23   146   148    17    48    18
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   19    33    22    20    21    22    23   146   148    17    48    18
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:    19    33    22    20    21    22    23   146   148    17    48    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     391   391   391   393   393   393   446   446   446   425   425   425
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.26  0.44  0.30  0.32  0.33  0.35  0.15  0.92  0.93  0.41  1.16  0.43
Final Sat.:   100   174   116   125   131   137    65   411   416   174   492   184
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.19  0.19  0.19  0.16  0.16  0.16  0.36  0.36  0.36  0.10  0.10  0.10
Crit Moves:  ****              ****                          ****        ****
ApproachV/S:       0.19              0.16              0.36              0.10
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    2.1   2.1   2.1   1.8   1.8   1.8   3.9   3.9   3.9   1.4   1.4   1.4
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   2.1   2.1   2.1   1.8   1.8   1.8   3.9   3.9   3.9   1.4   1.4   1.4
LOS by Move:    A     A     A     A     A     A     A     A     A     A     A     A
ApproachDel:        2.1               1.8               3.9               1.4
LOS by Appr:          A                 A                 A                 A
******************************************************************************

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```

```
PM Existing + FA18          Fri Oct 17, 1997 17:07:19               Page 18-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Future Volume Alternative)
******************************************************************************
Intersection #301 Evan Hewes & Drew
******************************************************************************
Cycle (sec):            1               Critical Vol./Cap. (X):        0.398
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):        3.8
Optimal Cycle:          0               Level Of Service:                 A
******************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17    30    20    18    19    20    21   131   133    15    43    16
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   17    30    20    18    19    20    21   131   133    15    43    16
Added Vol:      0     0    10    10     0     0     0    31     0    40   121    40
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   17    30    30    28    19    20    21   162   133    55   164    56
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    19    33    33    31    21    22    23   180   148    61   182    62
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   19    33    33    31    21    22    23   180   148    61   182    62
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:    19    33    33    31    21    22    23   180   148    61   182    62
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     260   260   260   334   334   334   441   441   441   475   475   475
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.22  0.39  0.39  0.42  0.28  0.30  0.13  1.03  0.84  0.40  1.19  0.41
Final Sat.:    58   101   101   140    95    99    58   452   372   190   567   193
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.33  0.33  0.33  0.22  0.22  0.22  0.40  0.40  0.40  0.32  0.32  0.32
Crit Moves:              ****        ****                    **** ****
ApproachV/S:       0.33              0.22              0.40              0.32
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    3.5   3.5   3.5   2.3   2.3   2.3   4.5   4.5   4.5   3.4   3.4   3.4
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   3.5   3.5   3.5   2.3   2.3   2.3   4.5   4.5   4.5   3.4   3.4   3.4
LOS by Move:    A     A     A     A     A     A     A     A     A     A     A     A
ApproachDel:        3.5               2.3               4.5               3.4
LOS by Appr:          A                 A                 A                 A
******************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM + F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18          Fri Oct 17, 1997 17:07:19                  Page 19-1
--------------------------------------------------------------------------------
                           Traffic Impact Analysis
                         F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            1994 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #302 Evan Hewes & Bennett
********************************************************************************
Cycle (sec):           1               Critical Vol./Cap. (X):         0.527
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):         2.8
Optimal Cycle:         0               Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1    1    1    116   32   22      7  146    3      1   95   34
Growth Adj:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:    1    1    1    116   32   22      7  146    3      1   95   34
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:     1    1    1    129   36   24      8  162    3      1  106   38
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:    1    1    1    129   36   24      8  162    3      1  106   38
PCE Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:     1    1    1    129   36   24      8  162    3      1  106   38
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     117  117  117    336  336  336    313  313  313    274  274  274
Adjustment:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Lanes:       0.34 0.33 0.33   0.78 0.22 1.00   1.00 0.98 0.02   0.01 0.99 1.00
Final Sat.:    39   39   39    263   73  336    313  307    6      3  271  274
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.03 0.03   0.49 0.49 0.07   0.03 0.53 0.53   0.39 0.39 0.14
Crit Moves:            ****   ****                  ****             ****
ApproachV/S:      0.03             0.28             0.28             0.26
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    1.1  1.1  1.1    6.5  6.5  1.3    1.1  7.4  7.4    4.4  4.4  1.7
Delay Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:   1.1  1.1  1.1    6.5  6.5  1.3    1.1  7.4  7.4    4.4  4.4  1.7
LOS by Move:    A    A    A      B    B    A      A    B    B      A    A    A
ApproachDel:       1.1              2.9              2.9              2.7
LOS by Appr:        A                A                A                A
********************************************************************************

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```

```
PM Existing + FA18          Fri Oct 17, 1997 17:07:19                  Page 20-1
--------------------------------------------------------------------------------
                           Traffic Impact Analysis
                         F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #302 Evan Hewes & Bennett
********************************************************************************
Cycle (sec):           1               Critical Vol./Cap. (X):         2.806
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):       444.3
Optimal Cycle:         0               Level Of Service:                  F
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1    1    1    116   32   22      7  146    3      1   95   34
Growth Adj:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:    1    1    1    116   32   22      7  146    3      1   95   34
Added Vol:      0   69    0    873  269  201     52    0    0      0    0  226
PasserByVol:    0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:    1   70    1    989  301  223     59  146    3      1   95  260
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:     1   78    1   1099  334  248     66  162    3      1  106  289
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:    1   78    1   1099  334  248     66  162    3      1  106  289
PCE Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:     1   78    1   1099  334  248     66  162    3      1  106  289
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     468  468  468    567  567  567    206  206  206    103  103  103
Adjustment:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Lanes:       0.01 0.98 0.01   0.77 0.23 1.00   1.00 0.98 0.02   0.01 0.99 1.00
Final Sat.:     6  456    6    435  132  567    206  202    4      1  102  103
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.17 0.17   2.53 2.53 0.44   0.32 0.80 0.80   1.04 1.04 2.81
Crit Moves:       ****             ****             ****                  ****
ApproachV/S:      0.17             1.48             0.56             1.92
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    1.9  1.9  1.9  14822 xxxx  5.3    3.4 21.0 21.0   51.8 51.8 42708
Delay Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:   1.9  1.9  1.9  14822 xxxx  5.3    3.4 21.0 21.0   51.8 51.8 42708
LOS by Move:    A    A    A      F    F    B      A    D    D      F    F    F
ApproachDel:       1.9            279.5              8.4           1487.5
LOS by Appr:        A                F                B                F
********************************************************************************

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```

Table D-1
Traffic Impact Analysis: Existing AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Existing + FA18         Fri Oct 17, 1997 17:07:19                  Page 21-1
--------------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #303 Evan Hewes & Forrester
********************************************************************************
Cycle (sec):          1               Critical Vol./Cap. (X):        0.727
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):        4.9
Optimal Cycle:        0               Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       19   90   14     31  151   15     51  193   31     17  115   19
Growth Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:    19   90   14     31  151   15     51  193   31     17  115   19
User Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:      0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:     21  100   16     34  168   17     57  214   34     19  128   21
Reduct Vol:      0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:    21  100   16     34  168   17     57  214   34     19  128   21
PCE Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:     21  100   16     34  168   17     57  214   34     19  128   21
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:      405  405  405    443  443  443    341  341  341    304  304  304
Adjustment:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Lanes:        0.15 0.73 0.12   0.15 0.77 0.08   1.00 0.86 0.14   1.00 0.86 0.14
Final Sat.:     62  296   47     69  340   34    341  294   47    304  261   43
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.34 0.34 0.34   0.49 0.49 0.49   0.17 0.73 0.73   0.06 0.49 0.49
Crit Moves:   ****                        ****             ****             ****
ApproachV/S:       0.34             0.49             0.45             0.28
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:     3.6  3.6  3.6    6.5  6.5  6.5    1.9 15.9 15.9    1.3  6.4  6.4
Delay Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:    3.6  3.6  3.6    6.5  6.5  6.5    1.9 15.9 15.9    1.3  6.4  6.4
LOS by Move:     A    A    A      B    B    B      A    C    C      A    B    B
ApproachDel:        3.6              6.5              5.5              2.9
LOS by Appr:         A                B                B                A
********************************************************************************

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```

```
PM Existing + FA18         Fri Oct 17, 1997 17:07:19                  Page 22-1
--------------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
         1994 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #303 Evan Hewes & Forrester
********************************************************************************
Cycle (sec):          1               Critical Vol./Cap. (X):        2.195
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):      136.6
Optimal Cycle:        0               Level Of Service:                 F
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       19   90   14     31  151   15     51  193   31     17  115   19
Growth Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:    19   90   14     31  151   15     51  193   31     17  115   19
Added Vol:      24    0    0      0    0   45    175  604   94      0  156    0
PasserByVol:     0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:    43   90   14     31  151   60    226  797  125     17  271   19
User Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:      0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:     48  100   16     34  168   67    251  886  139     19  301   21
Reduct Vol:      0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:    48  100   16     34  168   67    251  886  139     19  301   21
PCE Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:     48  100   16     34  168   67    251  886  139     19  301   21
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:      262  262  262    198  198  198    467  467  467    382  382  382
Adjustment:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Lanes:        0.29 0.61 0.10   0.13 0.62 0.25   1.00 0.86 0.14   1.00 0.93 0.07
Final Sat.:     77  160   26     25  124   49    467  404   63    382  357   25
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.63 0.63 0.63   1.36 1.36 1.36   0.54 2.19 2.19   0.05 0.84 0.84
Crit Moves:        ****        ****                        ****             ****
ApproachV/S:       0.63             1.36             1.37             0.45
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    10.8 10.8 10.8  174.6  175 174.6    7.7 4190 4190    1.2 24.6 24.6
Delay Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:   10.8 10.8 10.8  174.6  175 174.6    7.7 4190 4190    1.2 24.6 24.6
LOS by Move:     C    C    C      F    F    F      B    F    F      A    D    D
ApproachDel:       10.8            174.6            179.7              5.5
LOS by Appr:         C                F                F                B
********************************************************************************

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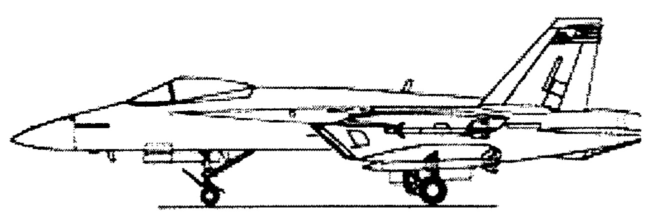

AM AND PM CUMULATIVE PLUS F/A-18E/F TRAFFIC

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic

```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42                    Page 1-1
--------------------------------------------------------------------------------
                            Traffic Impact Analysis
                           F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                                 Scenario Report
Scenario:                   AM Cum + FA18 Project

Command:                    Default
Volume:                     AM Cum Base FA18
Geometry:                   AM Existing
Impact Fee:                 Default Impact Fee
Trip Generation:            AM FA-18
Trip Distribution:          E2 Default
Paths:                      Default Paths
Routes:                     Default Routes
Configuration:              Default Configuration
```

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

AM Cum + FA18 Project   Mon Oct 20, 1997 09:47:42   Page 2-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Personnel On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	433.00	FA 18 Personne	0.02	0.02	9	9	18	0.7
	Zone 101 Subtotal					9	9	18	0.7
102	Lemoore Hous	111.00	FA 18 Personne	0.02	0.02	2	2	4	0.2
	Zone 102 Subtotal					2	2	4	0.2
103	Lemoore Main	464.00	FA 18 Personne	0.02	0.02	9	9	18	0.7
	Zone 103 Subtotal					9	9	18	0.7
307	NAF El Centr	1890.00	FA 18 Personne	0.02	0.02	38	38	76	3.0
	Zone 307 Subtotal					38	38	76	3.0
TOTAL						58	58	116	4.6

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AM Cum + FA18 Project   Mon Oct 20, 1997 09:47:42   Page 3-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Spouses/Dependants On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	178.00	FA 18 Spouse O	0.00	0.30	0	53	53	2.1
	Zone 101 Subtotal					0	53	53	2.1
102	Lemoore Hous	46.00	FA 18 Spouse O	0.00	0.30	0	14	14	0.6
	Zone 102 Subtotal					0	14	14	0.6
103	Lemoore Main	191.00	FA 18 Spouse O	0.00	0.30	0	57	57	2.3
	Zone 103 Subtotal					0	57	57	2.3
307	NAF El Centr	778.00	FA 18 Spouses	0.00	0.30	0	233	233	9.3
	Zone 307 Subtotal					0	233	233	9.3
TOTAL						0	357	357	14.3

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

AM Cum + FA18 Project — Mon Oct 20, 1997 09:47:42 — Page 4-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	251.00	FA 18 Personne	1.00	0.03	251	8	259	10.3
	Zone 101 Subtotal					251	8	259	10.3
102	Lemoore Hous	64.00	FA 18 Personne	1.00	0.03	64	2	66	2.6
	Zone 102 Subtotal					64	2	66	2.6
103	Lemoore Main	269.00	FA 18 Personne	1.00	0.03	269	8	277	11.1
	Zone 103 Subtotal					269	8	277	11.1
307	NAF El Centr	1067.00	FA 18 Personne	1.00	0.03	1067	32	1099	43.9
	Zone 307 Subtotal					1067	32	1099	43.9
TOTAL						1651	50	1701	67.9

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AM Cum + FA18 Project — Mon Oct 20, 1997 09:47:42 — Page 5-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for AM Support Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	52.00	FA 18 Support	1.00	0.03	52	2	54	2.2
	Zone 101 Subtotal					52	2	54	2.2
102	Lemoore Hous	13.00	FA 18 Support	1.00	0.03	13	0	13	0.5
	Zone 102 Subtotal					13	0	13	0.5
103	Lemoore Main	55.00	FA 18 Support	1.00	0.03	55	2	57	2.3
	Zone 103 Subtotal					55	2	57	2.3
307	NAF El Centr	200.00	FA 18 Support	1.00	0.03	200	6	206	8.2
	Zone 307 Subtotal					200	6	206	8.2
TOTAL						320	10	330	13.2

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

AM Cum + FA18 Project   Mon Oct 20, 1997 09:47:42   Page 6-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Distribution Report

Percent Of Trips E2 Default

Zone	To Gates 1	2	3	4	5	6	11	12	13	14	15
101	23.0	47.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	89.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	92.0	0.0	6.0	2.0	0.0	0.0	0.0	0.0	0.0
307	0.0	0.0	0.0	0.0	0.0	0.0	9.0	3.0	3.0	20.0	13.0

Zone	To Gates 16	17
101	0.0	0.0
102	0.0	0.0
103	0.0	0.0
307	45.0	7.0

AM Cum + FA18 Project   Mon Oct 20, 1997 09:47:42   Page 7-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Turning Movement Report
M Personnel On-Base + AM Spouses/Dependants On-Base + AM Personne

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#38													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#40													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#44													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#53													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#55													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#101 Jackson & Main Gate													
Base	2	6	4	61	6	8	8	72	2	10	150	865	1194
Added	0	0	0	74	0	2	7	0	0	0	0	326	409
Total	2	6	4	135	6	10	15	72	2	10	150	1191	1603
#102 SR 198 WB Ramps & Avenal Cut-Off													
Base	15	15	0	0	168	2	0	0	0	109	0	321	630
Added	20	9	0	0	18	0	0	0	0	0	0	70	117
Total	35	24	0	0	186	2	0	0	0	109	0	391	747
#103 SR 198 EB Ramps & Avenal Cut-Off													
Base	57	8	3	3	261	59	1	5	2	6	4	25	434
Added	0	29	0	0	2	16	0	0	5	0	0	0	52
Total	57	37	3	3	263	75	1	5	7	6	4	25	486
#104 SR 41 & Grangeville													
Base	302	239	17	9	284	82	66	47	20	24	316	14	1420
Added	94	0	0	0	0	72	17	34	22	0	147	0	386
Total	396	239	17	9	284	154	83	81	42	24	463	14	1806

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

AM Cum + FA18 Project — Mon Oct 20, 1997 09:47:42 — Page 7-2

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#201 Navalair & SR 1 SB Ramps													
Base	0	52	2	2	26	0	0	0	0	138	0	1	221
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	52	2	2	26	0	0	0	0	138	0	1	221
#202 Navalair & Wood													
Base	0	50	105	7	157	0	0	0	0	42	0	6	367
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	50	105	7	157	0	0	0	0	42	0	6	367
#203 N. Mugu & Frontage													
Base	43	34	0	0	54	360	123	0	15	0	0	0	629
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	43	34	0	0	54	360	123	0	15	0	0	0	629
#204 Main & Frontage													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#205 Las Posas & SR 1 NB Off Ramp													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#301 Evan Hewes & Drew													
Base	123	14	31	22	22	7	7	61	39	24	107	7	464
Added	0	0	39	39	0	0	0	117	0	9	28	9	241
Total	123	14	70	61	22	7	7	178	39	33	135	16	705
#302 Evan Hewes & Bennett													
Base	0	84	0	45	16	16	60	90	1	0	131	272	715
Added	0	261	0	201	62	46	196	0	0	0	0	848	1614
Total	0	345	0	246	78	62	256	90	1	0	131	1120	2329
#303 Evan Hewes & Forrester													
Base	35	65	11	30	107	76	26	170	19	104	239	12	894
Added	91	0	0	0	0	170	40	139	22	0	587	0	1049
Total	126	65	11	30	107	246	66	309	41	104	826	12	1943
#401 Alameda & First													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#402 Alameda & Third													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0

AM Cum + FA18 Project — Mon Oct 20, 1997 09:47:42 — Page 7-3

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#403 Alameda & Fourth													
Base	569	0	77	214	38	2640	0	401	58	0	0	0	3997
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	569	0	77	214	38	2640	0	401	58	0	0	0	3997
#404 Orange & First													
Base	511	0	47	0	0	0	0	20	103	64	541	0	1286
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	511	0	47	0	0	0	0	20	103	64	541	0	1286
#405 Orange & Third													
Base	209	267	0	0	407	25	0	0	0	1535	3749	344	6536
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	209	267	0	0	407	25	0	0	0	1535	3749	344	6536
#406 Orange & Fourth													
Base	0	475	369	379	1504	0	39	909	71	0	0	0	3746
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	475	369	379	1504	0	39	909	71	0	0	0	3746
#407 Orange & R.H. Dana Place													
Base	10	19	143	10	12	20	16	1408	42	572	993	23	3268
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	19	143	10	12	20	16	1408	42	572	993	23	3268

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

AM Cum + FA18 Project Mon Oct 20, 1997 09:47:42 Page 8-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/Veh	Base V/C	Future LOS	Future Del/Veh	Future V/C	Change in
#101 Jackson & Main Gate	B	6.7	0.162	E	47.8	1.000	+41.057 D/V
#102 SR 198 WB Ramps & Avenal Cut-O	B	2.9	0.000	B	3.2	0.000	+ 0.000 V/C
#103 SR 198 EB Ramps & Avenal Cut-O	B	1.0	0.000	B	1.0	0.000	+ 0.000 V/C
#104 SR 41 & Grangeville	B	14.4	0.550	C	22.3	0.881	+ 7.844 D/V
#301 Evan Hewes & Drew	A	3.4	0.411	B	8.3	0.755	+ 0.344 V/C
#302 Evan Hewes & Bennett	B	7.1	0.816	F	OVRFL	4.557	+ 3.741 V/C
#303 Evan Hewes & Forrester	B	9.0	0.792	F	OVRFL	2.530	+ 1.738 V/C

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AM Cum + FA18 Project Mon Oct 20, 1997 09:47:42 Page 9-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Level Of Service Computation Report
1994 HCM Operations Method (Base Volume Alternative)

Intersection #101 Jackson & Main Gate

Cycle (sec): 80 Critical Vol./Cap. (X): 0.162
Loss Time (sec): 12 (Y+R = 3 sec) Average Delay (sec/veh): 6.7
Optimal Cycle: 77 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	3	3	3	4	4	4	3	53	53	5	55	55
Lanes:	0 1	0	0 1	1 0	0	1 1	1 0	1	0 1	1 0	1	0 1
Volume Module:												
Base Vol:	2	6	4	61	6	8	8	72	2	10	150	865
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	6	4	61	6	8	8	72	2	10	150	865
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	2	7	4	68	7	9	9	80	2	11	167	961
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	7	4	68	7	9	9	80	2	11	167	961
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	2	7	4	68	7	9	9	80	2	11	167	961
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.97	0.97	0.83	0.93	0.90	0.90	0.93	0.98	0.83	0.93	0.98	0.83
Lanes:	0.22	0.78	1.00	1.00	0.88	1.12	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	410	1434	1583	1770	1500	1928	1770	1863	1583	1770	1863	1583
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.04	0.00	0.00	0.01	0.04	0.00	0.01	0.09	0.61
Crit Moves:		****		****			****				****	
Green/Cycle:	0.04	0.04	0.04	0.09	0.09	0.09	0.04	0.66	0.66	0.06	0.69	0.78
Volume/Cap:	0.13	0.13	0.07	0.44	0.05	0.05	0.14	0.06	0.00	0.10	0.13	0.78
Level Of Service Module:												
Delay/Veh:	24.1	24.1	24.0	23.7	21.6	21.6	24.1	3.1	2.9	22.9	2.8	5.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	24.1	24.1	24.0	23.7	21.6	21.6	24.1	3.1	2.9	22.9	2.8	5.7
Queue:	0	0	0	2	0	0	0	1	0	0	1	13

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project       Mon Oct 20, 1997 09:47:42                Page 10-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #101 Jackson & Main Gate
******************************************************************************
Cycle (sec):         80              Critical Vol./Cap. (X):         1.000
Loss Time (sec):     12 (Y+R =  3 sec) Average Delay (sec/veh):       47.8
Optimal Cycle:      152              Level Of Service:                   E
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase      Protected        Protected
Rights:          Include          Include         Include            Ovl
Min. Green:    3    3    3     4    4    4     3   53   53     5   55   55
Lanes:       0  1  0  0  1   1  0  0  1  1   1  0  1  0  1   1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      2    6    4    61    6    8     8   72    2    10  150  865
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   2    6    4    61    6    8     8   72    2    10  150  865
Added Vol:     0    0    0    74    0    2     7    0    0     0    0  326
PasserByVol:   0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   2    6    4   135    6   10    15   72    2    10  150 1191
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    2    7    4   150    7   11    17   80    2    11  167 1323
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   2    7    4   150    7   11    17   80    2    11  167 1323
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.05 1.05  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:    2    7    4   150    7   12    17   80    2    11  167 1323
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  0.97 0.97 0.83  0.93 0.89 0.89  0.93 0.98 0.83  0.93 0.98 0.83
Lanes:       0.22 0.78 1.00  1.00 0.74 1.26  1.00 1.00 1.00  1.00 1.00 1.00
Final Sat.:   410 1434 1583  1770 1249 2141  1770 1863 1583  1770 1863 1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00 0.00  0.08 0.01 0.01  0.01 0.04 0.00  0.01 0.09 0.84
Crit Moves:       ****       ****            ****                        ****
Green/Cycle: 0.04 0.04 0.04  0.08 0.08 0.08  0.04 0.67 0.67  0.06 0.70 0.77
Volume/Cap:  0.13 0.13 0.07  1.08 0.07 0.07  0.26 0.06 0.00  0.10 0.13 1.08
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   24.1 24.1 24.0 112.1 22.1 22.1  24.6  2.9  2.8  22.8  2.6 50.1
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  24.1 24.1 24.0 112.1 22.1 22.1  24.6  2.9  2.8  22.8  2.6 50.1
Queue:         0    0    0     8    0    0     0    1    0     0    1   60
******************************************************************************

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```

```
AM Cum + FA18 Project       Mon Oct 20, 1997 09:47:42                Page 11-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          1994 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):      2.9        Worst Case Level Of Service:        B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Ignore           Ignore          Include          Include
Lanes:       0  1  0  0  0   0  0  1  0  1   0  0  0  0  0   1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     15   15    0     0  168    2     0    0    0   109    0  321
Growth Adj:  1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  15   15    0     0  168    0     0    0    0   109    0  321
User Adj:    1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:   17   17    0     0  187    0     0    0    0   121    0  357
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:   17   17    0     0  187    0     0    0    0   121    0  357
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:            0%               0%               0%               0%
% Cycle/Cars:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
% Truck/Comb:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
PCE Adj:     1.10 1.00 1.00  1.10 1.00 1.00  1.10 1.10 1.10  1.10 1.10 1.10
Cycl/Car PCE:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Trck/Cmb PCE:  xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Adj Vol.:     18   17    0     0  187    0     0    0    0   133    0  392
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx  2.6
Critical Gp:  5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx  5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  187 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   220 xxxx   17
Potent Cap.: 1397 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   790 xxxx 1358
Adj Cap:     1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.99 xxxx 1.00
Move Cap.:   1397 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   779 xxxx 1358
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  2.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   5.5 xxxx  3.6
LOS by Move:   A     *     *     *    *     *     *    *     *     B    *    A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *     *     *     *    *     *     *    *     *     *    *    *
ApproachDel:        1.4              0.0              0.0              4.1

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM + F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42                Page 12-1
-------------------------------------------------------------------------------
                         Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           1994 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
*******************************************************************************
Average Delay (sec/veh):       3.2          Worst Case Level Of Service:      B
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      15   15    0     0  168    2     0    0    0   109    0  321
Growth Adj:  1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   15   15    0     0  168    0     0    0    0   109    0  321
Added Vol:     20    9    0     0   18    0     0    0    0     0    0   70
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   35   24    0     0  186    0     0    0    0   109    0  391
User Adj:    1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    39   27    0     0  207    0     0    0    0   121    0  434
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:    39   27    0     0  207    0     0    0    0   121    0  434
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
% Truck/Comb:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
PCE Adj:     1.10 1.00 1.00  1.10 1.00 1.00  1.10 1.10 1.10  1.10 1.10 1.10
Cycl/Car PCE:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Trck/Cmb PCE:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Adj Vol.:      43   27    0     0  207    0     0    0    0   133    0  478
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx  2.6
Critical Gp:  5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx  5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  207 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   272 xxxx   27
Potent Cap.: 1366 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   737 xxxx 1342
Adj Cap:     1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.97 xxxx 1.00
Move Cap.:   1366 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   713 xxxx 1342
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  2.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.1 xxxx  4.0
LOS by Move:    A    *    *     *    *    *     *    *    *     B    *    A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:        1.7              0.0              0.0              4.4

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```

```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42                Page 13-1
-------------------------------------------------------------------------------
                         Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            1994 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
*******************************************************************************
Average Delay (sec/veh):       1.0          Worst Case Level Of Service:      B
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:        1  0  1  0  1    1  0  1  0  1    0  1  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      57    8    3     3  261   59     1    5    2     6    4   25
Growth Adj:  1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   57    8    0     3  261    0     1    5    2     6    4   25
User Adj:    1.00 1.00 0.00  1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    63    9    0     3  290    0     1    6    2     7    4   28
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:    63    9    0     3  290    0     1    6    2     7    4   28
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
% Truck/Comb:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
PCE Adj:     1.10 1.00 1.00  1.10 1.00 1.00  1.10 1.10 1.10  1.10 1.10 1.10
Cycl/Car PCE:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Trck/Cmb PCE:   xxxx xxxx        xxxx xxxx        xxxx xxxx        xxxx xxxx
Adj Vol.:      70    9    0     4  290    0     1    6    2     7    5   31
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx   2.1 xxxx xxxxx   3.4  3.3  2.6   3.4  3.3  2.6
Critical Gp:  5.0 xxxx xxxxx   5.0 xxxx xxxxx   6.5  6.0  5.5   6.5  6.0  5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  290 xxxx xxxxx     9 xxxx xxxxx   382  366  290   369  366    9
Potent Cap.: 1247 xxxx xxxxx  1698 xxxx xxxxx   637  701  987   647  701 1370
Adj Cap:     1.00 xxxx xxxxx  1.00 xxxx xxxxx  0.93 0.94 1.00  0.95 0.94 1.00
Move Cap.:   1247 xxxx xxxxx  1698 xxxx xxxxx   591  661  987   613  661 1370
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  3.0 xxxx xxxxx   2.1 xxxx xxxxx   6.1  5.5  3.7   5.9  5.5  2.7
LOS by Move:    A    *    *     A    *    *     *    B    A     *    *    A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   648 xxxx xxxxx   631 xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   5.6 xxxx xxxxx   5.8 xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     B    *    *     B    *    *
ApproachDel:        2.7              0.0              5.1              3.6

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42             Page 14-1
--------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------
                     Level Of Service Computation Report
          1994 HCM Unsignalized Method (Future Volume Alternative)
**************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
**************************************************************************
Average Delay (sec/veh):        1.0          Worst Case Level Of Service:    B
**************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Ignore           Ignore          Include          Include
Lanes:       1  0  1  0  1    1  0  1  0  1    0  1  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     57     8     3     3   261    59     1     5     2     6     4    25
Growth Adj: 1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:  57     8     0     3   261     0     1     5     2     6     4    25
Added Vol:     0    29     0     0     2    16     0     0     5     0     0     0
PasserByVol:   0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:  57    37     0     3   263     0     1     5     7     6     4    25
User Adj:   1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:    0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:   63    41     0     3   292     0     1     6     8     7     4    28
Reduct Vol:    0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:   63    41     0     3   292     0     1     6     8     7     4    28
Adjusted Volume Module:
Grade:            0%               0%               0%               0%
% Cycle/Cars:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:    1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:     70    41     0     4   292     0     1     6     9     7     5    31
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx   2.1 xxxx xxxxx   3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:  5.0 xxxx xxxxx   5.0 xxxx xxxxx   6.5   6.0   5.5   6.5   6.0   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  292 xxxx xxxxx    41 xxxx xxxxx   416   400   292   407   400    41
Potent Cap.: 1244 xxxx xxxxx  1639 xxxx xxxxx   608   673   985   616   673  1320
Adj Cap:     1.00 xxxx xxxxx  1.00 xxxx xxxxx  0.93  0.94  1.00  0.94  0.94  1.00
Move Cap.:   1244 xxxx xxxxx  1639 xxxx xxxxx   564   634   985   579   634  1320
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  3.0 xxxx xxxxx   2.2 xxxx xxxxx   6.4   5.7   3.7   6.3   5.7   2.8
LOS by Move:    A     *     *    A     *     *     *     B     A     *     *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   621 xxxx xxxxx   600 xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   5.9 xxxx xxxxx   6.1 xxxx xxxxx
Shared LOS:     *     *     *    *     *     *     B     *     *     B     *     *
ApproachDel:         1.9              0.0              4.7              3.7

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```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42             Page 15-1
--------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------
                     Level Of Service Computation Report
          1994 HCM Operations Method (Base Volume Alternative)
**************************************************************************
Intersection #104 SR 41 & Grangeville
**************************************************************************
Cycle (sec):         80               Critical Vol./Cap. (X):         0.550
Loss Time (sec):      9 (Y+R =  9 sec) Average Delay (sec/veh):        14.4
Optimal Cycle:       36               Level Of Service:                  B
**************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0     0     0     0     0     0     0     0     0     0
Lanes:       1  0  2  0  1    1  0  2  0  1    0  1  0  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:    302   239    17     9   284    82    66    47    20    24   316    14
Growth Adj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse: 302   239    17     9   284    82    66    47    20    24   316    14
User Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:    0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:  336   266    19    10   316    91    73    52    22    27   351    16
Reduct Vol:    0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol: 336   266    19    10   316    91    73    52    22    27   351    16
PCE Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:    1.00  1.05  1.00  1.00  1.05  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:  336   279    19    10   331    91    73    52    22    27   351    16
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment: 0.93  0.98  0.83  0.93  0.98  0.83  0.35  0.35  0.83  0.95  0.95  0.83
Lanes:      1.00  2.00  1.00  1.00  2.00  1.00  0.58  0.42  1.00  0.07  0.93  1.00
Final Sat.: 1770  3725  1583  1770  3725  1583   392   279  1583   129  1678  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.19  0.07  0.01  0.01  0.09  0.06  0.19  0.19  0.01  0.21  0.21  0.01
Crit Moves: ****                    ****                                  ****
Green/Cycle: 0.35 0.47  0.47  0.04  0.16  0.16  0.38  0.38  0.38  0.38  0.38  0.38
Volume/Cap: 0.55  0.16  0.03  0.16  0.55  0.36  0.49  0.49  0.04  0.55  0.55  0.03
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:  14.5   7.8   7.3  24.3  20.8  19.6  13.4  13.4  10.1  13.3  13.3  10.0
User DelAdj: 1.00 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh: 14.5   7.8   7.3  24.3  20.8  19.6  13.4  13.4  10.1  13.3  13.3  10.0
Queue:         6     4     0     0     7     2     1     1     0     1     6     0
**************************************************************************

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```

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project        Mon Oct 20, 1997 09:47:42              Page 16-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                   Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #104 SR 41 & Grangeville
******************************************************************************
Cycle (sec):          80            Critical Vol./Cap. (X):        0.881
Loss Time (sec):       9 (Y+R =  9 sec) Average Delay (sec/veh):     22.3
Optimal Cycle:        85            Level Of Service:                 C
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        1  0  2  0  1   1  0  2  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     302  239   17     9  284   82    66   47   20    24  316   14
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  302  239   17     9  284   82    66   47   20    24  316   14
Added Vol:     94    0    0     0    0   72    17   34   22     0  147    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  396  239   17     9  284  154    83   81   42    24  463   14
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:   440  266   19    10  316  171    92   90   47    27  514   16
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  440  266   19    10  316  171    92   90   47    27  514   16
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.05 1.00  1.00 1.05 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:   440  279   19    10  331  171    92   90   47    27  514   16
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  0.93 0.98 0.83  0.93 0.98 0.83  0.23 0.23 0.83  0.95 0.95 0.83
Lanes:       1.00 2.00 1.00  1.00 2.00 1.00  0.51 0.49 1.00  0.05 0.95 1.00
Final Sat.:  1770 3725 1583  1770 3725 1583   217  212 1583    90 1717 1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.25 0.07 0.01  0.01 0.09 0.11  0.42 0.42 0.03  0.30 0.30 0.01
Crit Moves:  ****                      ****        ****
Green/Cycle: 0.28 0.38 0.38  0.03 0.12 0.12  0.48 0.48 0.48  0.48 0.48 0.48
Volume/Cap:  0.88 0.20 0.03  0.20 0.72 0.88  0.88 0.88 0.06  0.62 0.62 0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   29.3 10.9 10.2  24.8 25.7 45.8  34.5 34.5  7.1  10.9 10.9  7.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  29.3 10.9 10.2  24.8 25.7 45.8  34.5 34.5  7.1  10.9 10.9  7.0
Queue:         11    4    0     0    8    5     3    3    1     1    9    0
******************************************************************************

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AM Cum + FA18 Project        Mon Oct 20, 1997 09:47:42              Page 17-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                   Level Of Service Computation Report
          1994 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #301 Evan Hewes & Drew
******************************************************************************
Cycle (sec):           1            Critical Vol./Cap. (X):        0.411
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):      3.4
Optimal Cycle:         0            Level Of Service:                 A
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1!  0  0   0  0  1!  0  0   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     123   14   31    22   22    7     7   61   39    24  107    7
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  123   14   31    22   22    7     7   61   39    24  107    7
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:   137   16   34    24   24    8     8   68   43    27  119    8
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  137   16   34    24   24    8     8   68   43    27  119    8
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:   137   16   34    24   24    8     8   68   43    27  119    8
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     455  455  455   299  299  299   225  225  225   283  283  283
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.73 0.09 0.18  0.43 0.43 0.14  0.13 1.15 0.72  0.35 1.55 0.10
Final Sat.:   333   39   83   128  128   43    30  257  163    99  437   29
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.41 0.41 0.41  0.19 0.19 0.19  0.26 0.26 0.26  0.27 0.27 0.27
Crit Moves:            ****        ****             ****             ****
ApproachV/S:      0.41             0.19             0.26             0.27
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    4.8  4.8  4.8   2.0  2.0  2.0   2.7  2.7  2.7   2.8  2.8  2.8
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   4.8  4.8  4.8   2.0  2.0  2.0   2.7  2.7  2.7   2.8  2.8  2.8
LOS by Move:    A    A    A     A    A    A     A    A    A     A    A    A
ApproachDel:      4.8              2.0              2.7              2.8
LOS by Appr:       A                A                A                A
******************************************************************************

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42                Page 18-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Future Volume Alternative)
******************************************************************************
Intersection #301 Evan Hewes & Drew
******************************************************************************
Cycle (sec):          1             Critical Vol./Cap. (X):         0.755
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):        8.3
Optimal Cycle:        0             Level Of Service:                   B
******************************************************************************
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0   0  0  1! 0  0   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      123   14   31    22   22    7     7   61   39    24  107    7
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   123   14   31    22   22    7     7   61   39    24  107    7
Added Vol:       0    0   39    39    0    0     0  117    0     9   28    9
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   123   14   70    61   22    7     7  178   39    33  135   16
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    137   16   78    68   24    8     8  198   43    37  150   18
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   137   16   78    68   24    8     8  198   43    37  150   18
PCE Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:    137   16   78    68   24    8     8  198   43    37  150   18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:      306  306  306   334  334  334   278  278  278   300  300  300
Adjustment:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:        0.59 0.07 0.34  0.68 0.24 0.08  0.06 1.59 0.35  0.36 1.46 0.18
Final Sat.:    181   21  103   227   80   27    18  442   96   108  439   53
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.75 0.75 0.75  0.30 0.30 0.30  0.45 0.45 0.45  0.34 0.34 0.34
Crit Moves:             ****       ****                  ****       ****
ApproachV/S:       0.75             0.30             0.45             0.34
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    17.6 17.6 17.6   3.1  3.1  3.1   5.5  5.5  5.5   3.7  3.7  3.7
Delay Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   17.6 17.6 17.6   3.1  3.1  3.1   5.5  5.5  5.5   3.7  3.7  3.7
LOS by Move:     C    C    C     A    A    A     B    B    B     A    A    A
ApproachDel:       17.6              3.1              5.5              3.7
LOS by Appr:          C                A                B                A
******************************************************************************

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```

```
AM Cum + FA18 Project      Mon Oct 20, 1997 09:47:42                Page 19-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
            1994 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #302 Evan Hewes & Bennett
******************************************************************************
Cycle (sec):          1             Critical Vol./Cap. (X):         0.816
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):        7.1
Optimal Cycle:        0             Level Of Service:                   B
******************************************************************************
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0   0  1  0  0  1   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0   84    0    45   16   16    60   90    1     0  131  272
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0   84    0    45   16   16    60   90    1     0  131  272
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:      0   93    0    50   18   18    67  100    1     0  146  302
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:     0   93    0    50   18   18    67  100    1     0  146  302
PCE Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:      0   93    0    50   18   18    67  100    1     0  146  302
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:      174  174  174   303  303  303   443  443  443   370  370  370
Adjustment:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:        0.00 1.00 0.00  0.74 0.26 1.00  1.00 0.99 0.01  0.00 1.00 1.00
Final Sat.:      0  174    0   223   80  303   443  439    4     0  370  370
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.00 0.53 0.00  0.22 0.22 0.06  0.15 0.23 0.23  0.00 0.39 0.82
Crit Moves:        ****             ****             ****                  ****
ApproachV/S:       0.53             0.14             0.19             0.61
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:     0.0  7.6  0.0   2.3  2.3  1.3   1.8  2.4  2.4   0.0  4.5 22.2
Delay Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:    0.0  7.6  0.0   2.3  2.3  1.3   1.8  2.4  2.4   0.0  4.5 22.2
LOS by Move:     *    B    *     A    A    A     A    A    A     *    A    D
ApproachDel:        7.6              1.7              2.1             10.0
LOS by Appr:          B                A                A                B
******************************************************************************

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project        Mon Oct 20, 1997 09:47:42                 Page 20-1
--------------------------------------------------------------------------------
                              Traffic Impact Analysis
                            F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                        Level Of Service Computation Report
            1994 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #302 Evan Hewes & Bennett
********************************************************************************
Cycle (sec):          1                 Critical Vol./Cap. (X):        4.557
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):       8579.3
Optimal Cycle:        0                 Level Of Service:                  F
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  0  0    0  1  0  0  1    1  0  0  1  0   .0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   84     0    45   16    16    60   90     1     0  131   272
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   84     0    45   16    16    60   90     1     0  131   272
Added Vol:      0  261     0   201   62    46   196    0     0     0    0   848
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  345     0   246   78    62   256   90     1     0  131  1120
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     0  383     0   273   87    69   284  100     1     0  146  1244
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0  383     0   273   87    69   284  100     1     0  146  1244
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     0  383     0   273   87    69   284  100     1     0  146  1244
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     267  267   267   366  366   366   414  414   414   273  273   273
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  0.00  0.76 0.24  1.00  1.00 0.99  0.01  0.00 1.00  1.00
Final Sat.:     0  267     0   278   88   366   414  410     4     0  273   273
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 1.43  0.00  0.98 0.98  0.19  0.69 0.24  0.24  0.00 0.53  4.56
Crit Moves:       ****              ****        ****                        ****
ApproachV/S:      1.43              0.59              0.46              2.55
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    0.0  233   0.0  42.0 42.0   2.0  13.6  2.5   2.5   0.0  7.6 xxxxx
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  233   0.0  42.0 42.0   2.0  13.6  2.5   2.5   0.0  7.6 xxxxx
LOS by Move:    *    F     *     E    E     A     C    A     A     *    B     F
ApproachDel:     233.0              9.3               5.9            xxxxxx
LOS by Appr:       F                 B                 B                 F
********************************************************************************

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```
AM Cum + FA18 Project        Mon Oct 20, 1997 09:47:42                 Page 21-1
--------------------------------------------------------------------------------
                              Traffic Impact Analysis
                            F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                        Level Of Service Computation Report
             1994 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #303 Evan Hewes & Forrester
********************************************************************************
Cycle (sec):          1                 Critical Vol./Cap. (X):        0.792
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):         9.0
Optimal Cycle:        0                 Level Of Service:                  B
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      35   65    11    30  107    76    26  170    19   104  239    12
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   35   65    11    30  107    76    26  170    19   104  239    12
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:    39   72    12    33  119    84    29  189    21   116  266    13
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   39   72    12    33  119    84    29  189    21   116  266    13
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    39   72    12    33  119    84    29  189    21   116  266    13
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     368  368   368   298  298   298   329  329   329   384  384   384
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.32 0.58  0.10  0.14 0.50  0.36  1.00 0.90  0.10  1.00 0.95  0.05
Final Sat.:   117  215    36    42  150   106   329  296    33   384  366    18
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.33 0.33  0.33  0.79 0.79  0.79  0.09 0.64  0.64  0.30 0.73  0.73
Crit Moves:  ****                         ****              ****              ****
ApproachV/S:      0.33              0.79              0.36              0.51
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    3.6  3.6   3.6  20.3 20.3  20.3   1.4 11.3  11.3   3.2 15.8  15.8
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   3.6  3.6   3.6  20.3 20.3  20.3   1.4 11.3  11.3   3.2 15.8  15.8
LOS by Move:    A    A     A     D    D     D     A    C     C     A    C     C
ApproachDel:       3.6              20.3               4.0               7.1
LOS by Appr:       A                 D                 A                 B
********************************************************************************

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
AM Cum + FA18 Project       Mon Oct 20, 1997 09:47:42              Page 22-1
-----------------------------------------------------------------------------
                           Traffic Impact Analysis
                         F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #303 Evan Hewes & Forrester
*****************************************************************************
Cycle (sec):          1              Critical Vol./Cap. (X):        2.530
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):    2999.1
Optimal Cycle:        0              Level Of Service:                 F
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      35   65    11    30  107    76    26  170    19   104  239    12
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   35   65    11    30  107    76    26  170    19   104  239    12
Added Vol:     91    0     0     0    0   170    40  139    22     0  587     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  126   65    11    30  107   246    66  309    41   104  826    12
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:   140   72    12    33  119   273    73  343    46   116  918    13
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  140   72    12    33  119   273    73  343    46   116  918    13
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   140   72    12    33  119   273    73  343    46   116  918    13
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     421  421   421   168  168   168   387  387   387   429  429   429
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.63 0.32  0.05  0.08 0.28  0.64  1.00 0.88  0.12  1.00 0.99  0.01
Final Sat.:   263  135    23    13   47   108   387  341    46   429  423     6
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.53 0.53  0.53  2.53 2.53  2.53  0.19 1.01  1.01  0.27 2.17  2.17
Crit Moves:       ****                   ****       ****             ****
ApproachV/S:      0.53             2.53             0.60             1.22
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    7.6  7.6   7.6 14959 xxxx 14959   2.0 45.6  45.6   2.8 3815  3815
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   7.6  7.6   7.6 14959 xxxx 14959   2.0 45.6  45.6   2.8 3815  3815
LOS by Move:    B    B     B     F    F     F     A    F     F     A    F     F
ApproachDel:       7.6            xxxxxx             9.7            103.2
LOS by Appr:        B                F                B                F
*****************************************************************************

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PM Cum + FA18 Project       Mon Oct 20, 1997 09:49:29              Page 1-1
-----------------------------------------------------------------------------
                           Traffic Impact Analysis
                         F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                               Scenario Report
Scenario:              PM Cum + FA18 Project

Command:               Default
Volume:                PM Cum Base FA18
Geometry:              PM Existing
Impact Fee:            Default Impact Fee
Trip Generation:       PM FA-18
Trip Distribution:     E2 Default
Paths:                 Default Paths
Routes:                Default Routes
Configuration:         Default Configuration

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 2-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Personnel On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	433.00	FA 18 Personne	0.04	0.04	17	17	34	1.3
	Zone 101 Subtotal					17	17	34	1.3
102	Lemoore Hous	111.00	FA 18 Personne	0.04	0.04	4	4	8	0.3
	Zone 102 Subtotal					4	4	8	0.3
103	Lemoore Main	464.00	FA 18 Personne	0.04	0.04	19	19	38	1.5
	Zone 103 Subtotal					19	19	38	1.5
307	NAF El Centr	1890.00	FA 18 Personne	0.04	0.04	76	76	152	5.8
	Zone 307 Subtotal					76	76	152	5.8
TOTAL						116	116	232	8.9

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PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 3-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Spouses/Dependants On-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	178.00	FA 18 Spouse O	0.30	0.00	53	0	53	2.0
	Zone 101 Subtotal					53	0	53	2.0
102	Lemoore Hous	46.00	FA 18 Spouse O	0.30	0.00	14	0	14	0.5
	Zone 102 Subtotal					14	0	14	0.5
103	Lemoore Main	191.00	FA 18 Spouse O	0.30	0.00	57	0	57	2.2
	Zone 103 Subtotal					57	0	57	2.2
307	NAF El Centr	778.00	FA 18 Spouses	0.30	0.00	233	0	233	8.9
	Zone 307 Subtotal					233	0	233	8.9
TOTAL						357	0	357	13.6

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 4-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	251.00	FA 18 Personne	0.03	1.00	8	251	259	9.9
	Zone 101 Subtotal					8	251	259	9.9
102	Lemoore Hous	64.00	FA 18 Personne	0.03	1.00	2	64	66	2.5
	Zone 102 Subtotal					2	64	66	2.5
103	Lemoore Main	269.00	FA 18 Personne	0.03	1.00	8	269	277	10.6
	Zone 103 Subtotal					8	269	277	10.6
307	NAF El Centr	1067.00	FA 18 Personne	0.03	1.00	32	1067	1099	41.9
	Zone 307 Subtotal					32	1067	1099	41.9
TOTAL						50	1651	1701	64.9

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PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 5-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Generation Report

Forecast for PM Support Personnel Off-Base

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
101	Lemoore Oper	52.00	FA 18 Support	0.03	1.00	2	52	54	2.1
	Zone 101 Subtotal					2	52	54	2.1
102	Lemoore Hous	13.00	FA 18 Support	0.03	1.00	0	13	13	0.5
	Zone 102 Subtotal					0	13	13	0.5
103	Lemoore Main	55.00	FA 18 Support	0.03	1.00	2	55	57	2.2
	Zone 103 Subtotal					2	55	57	2.2
307	NAF El Centr	200.00	FA 18 Support	0.03	1.00	6	200	206	7.9
	Zone 307 Subtotal					6	200	206	7.9
TOTAL						10	320	330	12.6

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 6-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Trip Distribution Report

Percent Of Trips E2 Default

Zone	To Gates 1	2	3	4	5	6	11	12	13	14	15
101	23.0	47.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	89.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	92.0	0.0	6.0	2.0	0.0	0.0	0.0	0.0	0.0
307	0.0	0.0	0.0	0.0	0.0	0.0	9.0	3.0	3.0	20.0	13.0

Zone	To Gates 16	17
101	0.0	0.0
102	0.0	0.0
103	0.0	0.0
307	45.0	7.0

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PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 7-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Turning Movement Report
M Personnel On-Base + PM Spouses/Dependants On-Base + PM Personnel Off-Base + P

Volume Type	Northbound Left	Northbound Thru	Northbound Right	Southbound Left	Southbound Thru	Southbound Right	Eastbound Left	Eastbound Thru	Eastbound Right	Westbound Left	Westbound Thru	Westbound Right	Total Volume
#38													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#40													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#44													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#53													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#55													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#101 Jackson & Main Gate													
Base	3	6	4	671	6	14	6	195	2	2	141	140	1190
Added	0	0	0	336	0	7	2	0	0	0	0	84	429
Total	3	6	4	1007	6	21	8	195	2	2	141	224	1619
#102 SR 198 WB Ramps & Avenal Cut-Off													
Base	9	6	0	0	356	3	0	0	0	72	0	169	615
Added	5	2	0	0	81	0	0	0	0	0	0	18	106
Total	14	8	0	0	437	3	0	0	0	72	0	187	721
#103 SR 198 EB Ramps & Avenal Cut-Off													
Base	197	1	6	7	80	330	3	16	11	1	1	7	660
Added	0	7	0	0	9	72	0	0	21	0	0	0	109
Total	197	8	6	7	89	402	3	16	32	1	1	7	769
#104 SR 41 & Grangeville													
Base	115	327	26	18	278	39	197	254	73	40	110	16	1493
Added	24	0	0	0	0	18	74	150	96	0	38	0	400
Total	139	327	26	18	278	57	271	404	169	40	148	16	1893

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 7-2

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#201 Navalair & SR 1 SB Ramps													
Base	0	203	2	2	88	0	0	0	0	142	0	0	437
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	203	2	2	88	0	0	0	0	142	0	0	437
#202 Navalair & Wood													
Base	0	199	510	8	222	0	0	0	0	45	0	6	990
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	199	510	8	222	0	0	0	0	45	0	6	990
#203 N. Mugu & Frontage													
Base	24	84	0	0	26	200	615	0	31	0	0	0	980
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	24	84	0	0	26	200	615	0	31	0	0	0	980
#204 Main & Frontage													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#205 Las Posas & SR 1 NB Off Ramp													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#301 Evan Hewes & Drew													
Base	17	30	21	19	19	20	21	134	133	24	69	24	531
Added	0	0	10	10	0	0	0	31	0	40	121	40	252
Total	17	30	31	29	19	20	21	165	133	64	190	64	783
#302 Evan Hewes & Bennett													
Base	1	8	1	306	90	66	12	146	3	1	95	59	788
Added	0	69	0	873	269	201	52	0	0	0	0	226	1690
Total	1	77	1	1179	359	267	64	146	3	1	95	285	2478
#303 Evan Hewes & Forrester													
Base	22	90	14	31	151	20	89	324	52	17	132	19	961
Added	24	0	0	0	0	45	175	604	94	0	156	0	1098
Total	46	90	14	31	151	65	264	928	146	17	288	19	2059
#401 Alameda & First													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
#402 Alameda & Third													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:29   Page 7-3

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#403 Alameda & Fourth													
Base	89	0	106	529	263	427	0	2067	359	0	0	0	3840
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	89	0	106	529	263	427	0	2067	359	0	0	0	3840
#404 Orange & First													
Base	122	0	201	0	0	0	0	231	478	228	129	0	1389
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	122	0	201	0	0	0	0	231	478	228	129	0	1389
#405 Orange & Third													
Base	115	405	0	0	655	27	0	0	0	1002	665	83	2952
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	115	405	0	0	655	27	0	0	0	1002	665	83	2952
#406 Orange & Fourth													
Base	0	488	498	402	1180	0	21	2733	85	0	0	0	5407
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	488	498	402	1180	0	21	2733	85	0	0	0	5407
#407 Orange & R.H. Dana Place													
Base	87	63	601	47	38	66	74	1050	74	175	701	41	3017
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	87	63	601	47	38	66	74	1050	74	175	701	41	3017

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project       Mon Oct 20, 1997 09:49:30              Page 8-1
---------------------------------------------------------------------------
                        Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
---------------------------------------------------------------------------
                        Impact Analysis Report
                           Level Of Service

Intersection                          Base           Future        Change
                                    Del/   V/       Del/   V/        in
                                LOS Veh    C    LOS Veh    C
#101 Jackson & Main Gate          B  13.6 0.407  E  41.0 0.538  +27.329 D/V

#102 SR 198 WB Ramps & Avenal Cut-O B  1.8 0.000  B   1.8 0.000  + 0.000 V/C

#103 SR 198 EB Ramps & Avenal Cut-O B  2.3 0.000  B   2.3 0.000  + 0.000 V/C

#104 SR 41 & Grangeville          C  15.5 0.632  F 103.0 0.928  +87.538 D/V

#301 Evan Hewes & Drew            A   3.0 0.360  A   4.1 0.401  + 0.041 V/C

#302 Evan Hewes & Bennett         B   6.8 0.944  F OVRFL 3.484  + 2.539 V/C

#303 Evan Hewes & Forrester       B   9.4 1.069  F 280.7 2.491  + 1.422 V/C



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```

```
PM Cum + FA18 Project       Mon Oct 20, 1997 15:50:49              Page 9-1
---------------------------------------------------------------------------
                        Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
---------------------------------------------------------------------------
                    Level Of Service Computation Report
            1994 HCM Operations Method (Base Volume Alternative)
***************************************************************************
Intersection #101 Jackson & Main Gate
***************************************************************************
Cycle (sec):          80                Critical Vol./Cap. (X):        0.407
Loss Time (sec):      12 (Y+R =  3 sec) Average Delay (sec/veh):        12.9
Optimal Cycle:        80                Level Of Service:                  B
***************************************************************************
Approach:      North Bound     South Bound      East Bound      West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase     Split Phase      Protected       Protected
Rights:          Include         Include         Include           Ovl
Min. Green:    2    2    2    25   25   25     4   39   39     2   37   37
Lanes:         0  1  0  0  1   1  1  0  0  1   1  0  1  0  1   1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      3    6    4   671    6   14     6  195    2     2  141  140
Growth Adj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   3    6    4   671    6   14     6  195    2     2  141  140
User Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:    0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    3    7    4   746    7   16     7  217    2     2  157  156
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   3    7    4   746    7   16     7  217    2     2  157  156
PCE Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:    1.00 1.00 1.00  1.05 1.05 1.00  1.00 1.00 1.00  1.00 1.05 1.00
Final Vol.:    3    7    4   783    7   16     7  217    2     2  165  156
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment: 0.97 0.97 0.83  0.93 0.93 0.83  0.93 0.98 0.83  0.93 0.98 0.83
Lanes:      0.30 0.70 1.00  1.98 0.02 1.00  1.00 1.00 1.00  1.00 2.00 1.00
Final Sat.:  553 1291 1583  3508   31 1583  1770 1863 1583  1770 3725 1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01 0.01 0.00  0.22 0.22 0.01  0.00 0.12 0.00  0.00 0.04 0.10
Crit Moves:      ****             ****             ****       ****
Green/Cycle: 0.03 0.03 0.03 0.31 0.31 0.31  0.05 0.49 0.49  0.03 0.46 0.77
Volume/Cap: 0.22 0.22 0.10  0.71 0.71 0.03  0.08 0.24 0.00  0.05 0.10 0.13
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:  25.1 25.1 24.7  17.3 17.3 12.3  23.4  7.7  6.8  24.6  7.8  1.5
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh: 25.1 25.1 24.7  17.3 17.3 12.3  23.4  7.7  6.8  24.6  7.8  1.5
Queue:         0    0    0    16    0    0     0    3    0     0    2    1
***************************************************************************



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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project        Mon Oct 20, 1997 15:50:49                Page 10-1
-------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #101 Jackson & Main Gate
*******************************************************************************
Cycle (sec):          80             Critical Vol./Cap. (X):         0.538
Loss Time (sec):      12 (Y+R =  3 sec) Average Delay (sec/veh):      40.0
Optimal Cycle:        80             Level Of Service:                   D
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:          Include          Include          Include            Ovl
Min. Green:     2     2     2   25    25    25    4    39    39    2    37    37
Lanes:        0  1  0  0  1    1  1  0  0  1    1  0  1  0  1    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       3     6     4   671     6    14     6   195     2     2   141   140
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    3     6     4   671     6    14     6   195     2     2   141   140
Added Vol:      0     0     0   336     0     7     2     0     0     0     0    84
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    3     6     4  1007     6    21     8   195     2     2   141   224
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     3     7     4  1119     7    23     9   217     2     2   157   249
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    3     7     4  1119     7    23     9   217     2     2   157   249
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.05  1.05  1.00  1.00  1.00  1.00  1.00  1.05  1.00
Final Vol.:     3     7     4  1175     7    23     9   217     2     2   165   249
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.97  0.97  0.83  0.93  0.93  0.83  0.93  0.98  0.83  0.93  0.98  0.83
Lanes:       0.30  0.70  1.00  1.99  0.01  1.00  1.00  1.00  1.00  1.00  2.00  1.00
Final Sat.:   553  1291  1583  3518    21  1583  1770  1863  1583  1770  3725  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01  0.01  0.00  0.33  0.33  0.01  0.01  0.12  0.00  0.00  0.04  0.16
Crit Moves:        ****        ****                    ****        ****
Green/Cycle: 0.03  0.03  0.03  0.31  0.31  0.31  0.05  0.49  0.49  0.03  0.46  0.77
Volume/Cap:  0.22  0.22  0.10  1.07  1.07  0.05  0.10  0.24  0.00  0.05  0.10  0.20
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   25.1  25.1  24.7  59.4  59.4  12.4  23.5   7.7   6.8  24.6   7.8   1.6
User DelAdj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  25.1  25.1  24.7  59.4  59.4  12.4  23.5   7.7   6.8  24.6   7.8   1.6
Queue:          0     0     0    44     1     0     0     3     0     0     2     1
*******************************************************************************

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```

```
PM Cum + FA18 Project        Mon Oct 20, 1997 09:49:30                Page 11-1
-------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
*******************************************************************************
Average Delay (sec/veh):     1.8       Worst Case Level Of Service:          B
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       9     6     0     0   356     3     0     0     0    72     0   169
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    9     6     0     0   356     3     0     0     0    72     0   169
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    10     7     0     0   396     3     0     0     0    80     0   188
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    10     7     0     0   396     3     0     0     0    80     0   188
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:             0%               0%               0%               0%
% Cycle/Cars:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:     1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:  xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      11     7     0     0   396     3     0     0     0    88     0   207
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:  2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx    3.4 xxxx   2.6
Critical Gp:  5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx    6.5 xxxx   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  399 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx    412 xxxx     7
Potent Cap.: 1107 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx    611 xxxx  1374
Adj Cap:     1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.99 xxxx  1.00
Move Cap.:   1107 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx    605 xxxx  1374
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:  3.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx    6.9 xxxx   3.0
LOS by Move:    A    *     *     *    *     *     *    *     *      B    *     A
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:         2.0              0.0              0.0              4.2

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```

Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project       Mon Oct 20, 1997 09:49:30              Page 12-1
------------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #102 SR 198 WB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):       1.8          Worst Case Level Of Service:     B
******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include         Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        9     6     0     0   356     3     0     0     0    72     0   169
Growth Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:     9     6     0     0   356     3     0     0     0    72     0   169
Added Vol:       5     2     0     0    81     0     0     0     0     0     0    18
PasserByVol:     0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    14     8     0     0   437     3     0     0     0    72     0   187
User Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     16     9     0     0   486     3     0     0     0    80     0   208
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:     16     9     0     0   486     3     0     0     0    80     0   208
Adjusted Volume Module:
Grade:              0%               0%               0%               0%
% Cycle/Cars:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:       17     9     0     0   486     3     0     0     0    88     0   229
Critical Gap Module:
MoveUp Time:   2.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.4 xxxx   2.6
Critical Gp:   5.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   489 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   510 xxxx     9
Potent Cap.:  1003 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   536 xxxx  1370
Adj Cap:      1.00 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  0.98 xxxx  1.00
Move Cap.:    1003 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   527 xxxx  1370
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:   3.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx   3.1
LOS by Move:     A     *     *     *     *     *     *     *     *     B     *     A
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *     *     *     *     *     *     *     *     *     *     *     *
ApproachDel:          2.4              0.0              0.0              4.5

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```

```
PM Cum + FA18 Project       Mon Oct 20, 1997 09:49:30              Page 13-1
------------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
           1994 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):       2.3          Worst Case Level Of Service:     B
******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Ignore           Ignore          Include          Include
Lanes:        1  0  1  0  1    1  0  1  0  1    0  1  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      197     1     6     7    80   330     3    16    11     1     1     7
Growth Adj:   1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   197     1     0     7    80     0     3    16    11     1     1     7
User Adj:     1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    219     1     0     8    89     0     3    18    12     1     1     8
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    219     1     0     8    89     0     3    18    12     1     1     8
------------|---------------||---------------||---------------||---------------|
Adjusted Volume Module:
Grade:              0%               0%               0%               0%
% Cycle/Cars:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:    xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      241     1     0     9    89     0     4    20    13     1     1     9
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
MoveUp Time:   2.1 xxxx xxxxx   2.1 xxxx xxxxx   3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:   5.0 xxxx xxxxx   5.0 xxxx xxxxx   6.5   6.0   5.5   6.5   6.0   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    89 xxxx xxxxx     1 xxxx xxxxx   321   317    89   332   317     1
Potent Cap.:  1555 xxxx xxxxx  1712 xxxx xxxxx   690   744  1248   680   744  1383
Adj Cap:      1.00 xxxx xxxxx  1.00 xxxx xxxxx  0.87  0.84  1.00  0.85  0.84  1.00
Move Cap.:    1555 xxxx xxxxx  1712 xxxx xxxxx   601   626  1248   577   626  1383
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:   2.7 xxxx xxxxx   2.1 xxxx xxxxx   6.0   5.9   2.9   6.2   5.8   2.6
LOS by Move:     A     *     *     A     *     *     *     B     A     *     *     A
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx   622 xxxx xxxxx   600 xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.0 xxxx xxxxx   6.0 xxxx xxxxx
Shared LOS:      *     *     *     *     *     *     B     *     *     B     *     *
ApproachDel:          2.7              0.2              4.8              3.4

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM + F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project      Mon Oct 20, 1997 09:49:30                Page 14-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #103 SR 198 EB Ramps & Avenal Cut-Off
******************************************************************************
Average Delay (sec/veh):        2.3          Worst Case Level Of Service:     B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Ignore           Ignore           Include          Include
Lanes:        1  0  1  0  1    1  0  1  0  1    0  1  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      197     1     6     7    80   330     3    16    11     1     1     7
Growth Adj:   1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   197     1     0     7    80     0     3    16    11     1     1     7
Added Vol:       0     7     0     0     9    72     0     0    21     0     0     0
PasserByVol:     0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   197     8     0     7    89     0     3    16    32     1     1     7
User Adj:     1.00  1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.00  0.90  0.90  0.00  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    219     9     0     8    99     0     3    18    36     1     1     8
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:    219     9     0     8    99     0     3    18    36     1     1     8
Adjusted Volume Module:
Grade:              0%               0%               0%               0%
% Cycle/Cars:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
% Truck/Comb:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
PCE Adj:      1.10  1.00  1.00  1.10  1.00  1.00  1.10  1.10  1.10  1.10  1.10  1.10
Cycl/Car PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Trck/Cmb PCE:   xxxx  xxxx       xxxx  xxxx       xxxx  xxxx       xxxx  xxxx
Adj Vol.:      241     9     0     9    99     0     4    20    39     1     1     9
Critical Gap Module:
MoveUp Time:   2.1 xxxx xxxxx    2.1 xxxx xxxxx    3.4   3.3   2.6   3.4   3.3   2.6
Critical Gp:   5.0 xxxx xxxxx    5.0 xxxx xxxxx    6.5   6.0   5.5   6.5   6.0   5.5
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    99 xxxx xxxxx      9 xxxx xxxxx    339   334    99   361   334     9
Potent Cap.:  1538 xxxx xxxxx   1698 xxxx xxxxx    674   728  1234   654   728  1370
Adj Cap:      1.00 xxxx xxxxx   1.00 xxxx xxxxx   0.87  0.84  1.00  0.83  0.84  1.00
Move Cap.:    1538 xxxx xxxxx   1698 xxxx xxxxx    586   611  1234   542   611  1370
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Stopped Del:   2.7 xxxx xxxxx    2.1 xxxx xxxxx    6.2   6.1   3.0   6.7   5.9   2.6
LOS by Move:     A     *     *     A     *     *     *     B     A     *     *     A
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx   xxxx xxxx xxxxx    607 xxxx xxxxx    575 xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx  xxxxx xxxx xxxxx    6.1 xxxx xxxxx    6.3 xxxx xxxxx
Shared LOS:      *     *     *     *     *     *     B     *     *     B     *     *
ApproachDel:         2.6              0.2              4.2              3.5

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```

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PM Cum + FA18 Project      Mon Oct 20, 1997 09:49:30                Page 15-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Base Volume Alternative)
******************************************************************************
Intersection #104 SR 41 & Grangeville
******************************************************************************
Cycle (sec):          80               Critical Vol./Cap. (X):          0.632
Loss Time (sec):       9 (Y+R =  9 sec) Average Delay (sec/veh):         15.5
Optimal Cycle:        77               Level Of Service:                    C
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:     18    30    30     3    15    15    35    35    35    35    35    35
Lanes:        1  0  2  0  1    1  0  2  0  1    0  1  0  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      115   327    26    18   278    39   197   254    73    40   110    16
Growth Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   115   327    26    18   278    39   197   254    73    40   110    16
User Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    128   363    29    20   309    43   219   282    81    44   122    18
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   128   363    29    20   309    43   219   282    81    44   122    18
PCE Adj:      1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:      1.00  1.05  1.00  1.00  1.05  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:    128   382    29    20   324    43   219   282    81    44   122    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:   0.93  0.98  0.83  0.93  0.98  0.83  0.66  0.66  0.83  0.50  0.50  0.83
Lanes:        1.00  2.00  1.00  1.00  2.00  1.00  0.44  0.56  1.00  0.27  0.73  1.00
Final Sat.:   1770  3725  1583  1770  3725  1583   546   702  1583   252   698  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.07  0.10  0.02  0.01  0.09  0.03  0.40  0.40  0.05  0.17  0.17  0.01
Crit Moves:   ****                    ****              ****
Green/Cycle:  0.23  0.38  0.38  0.04  0.19  0.19  0.48  0.48  0.48  0.48  0.48  0.48
Volume/Cap:   0.32  0.27  0.05  0.30  0.46  0.14  0.85  0.85  0.11  0.37  0.37  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    16.9  11.3  10.3  25.0  19.0  17.6  19.5  19.5   7.5   8.9   8.9   7.2
User DelAdj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   16.9  11.3  10.3  25.0  19.0  17.6  19.5  19.5   7.5   8.9   8.9   7.2
Queue:           2     6     0     0     6     1     6     7     1     1     2     0
******************************************************************************

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:30   Page 16-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Level Of Service Computation Report
1994 HCM Operations Method (Future Volume Alternative)

Intersection #104 SR 41 & Grangeville

Cycle (sec):	80	Critical Vol./Cap. (X):	0.928
Loss Time (sec):	9 (Y+R = 9 sec)	Average Delay (sec/veh):	103.0
Optimal Cycle:	105	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	18	30	30	3	15	15	35	35	35	35	35	35
Lanes:	1 0	2 0	1	1 0	2 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	115	327	26	18	278	39	197	254	73	40	110	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	115	327	26	18	278	39	197	254	73	40	110	16
Added Vol:	24	0	0	0	0	18	74	150	96	0	38	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	139	327	26	18	278	57	271	404	169	40	148	16
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	154	363	29	20	309	63	301	449	188	44	164	18
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	154	363	29	20	309	63	301	449	188	44	164	18
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	154	382	29	20	324	63	301	449	188	44	164	18
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.98	0.83	0.61	0.61	0.83	0.36	0.36	0.83
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.40	0.60	1.00	0.21	0.79	1.00
Final Sat.:	1770	3725	1583	1770	3725	1583	464	691	1583	146	543	1583
Capacity Analysis Module:												
Vol/Sat:	0.09	0.10	0.02	0.01	0.09	0.04	0.65	0.65	0.12	0.30	0.30	0.01
Crit Moves:	****				****			****				
Green/Cycle:	0.23	0.38	0.38	0.04	0.19	0.19	0.48	0.48	0.48	0.48	0.48	0.48
Volume/Cap:	0.39	0.27	0.05	0.30	0.46	0.21	1.37	1.37	0.25	0.64	0.64	0.02
Level Of Service Module:												
Delay/Veh:	17.3	11.3	10.3	25.0	19.0	17.8	267.4	267	8.1	13.0	13.0	7.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	17.3	11.3	10.3	25.0	19.0	17.8	267.4	267	8.1	13.0	13.0	7.2
Queue:	3	6	0	0	6	1	32	46	2	1	3	0

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PM Cum + FA18 Project   Mon Oct 20, 1997 09:49:30   Page 17-1

Traffic Impact Analysis
F/A-18 E/F Squadron Siting

Level Of Service Computation Report
1994 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #301 Evan Hewes & Drew

Cycle (sec):	1	Critical Vol./Cap. (X):	0.360
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	3.0
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 1	0 1	0	0 1	0 1	0
Volume Module:												
Base Vol:	17	30	21	19	19	20	21	134	133	24	69	24
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	30	21	19	19	20	21	134	133	24	69	24
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	19	33	23	21	21	22	23	149	148	27	77	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	33	23	21	21	22	23	149	148	27	77	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	19	33	23	21	21	22	23	149	148	27	77	27
Saturation Flow Module:												
Sat/Lane:	358	358	358	369	369	369	444	444	444	441	441	441
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.25	0.44	0.31	0.33	0.33	0.34	0.14	0.94	0.92	0.41	1.18	0.41
Final Sat.:	91	158	110	121	121	127	64	413	411	182	518	182
Capacity Analysis Module:												
Vol/Sat:	0.21	0.21	0.21	0.17	0.17	0.17	0.36	0.36	0.36	0.15	0.15	0.15
Crit Moves:	****					****			****		****	
ApproachV/S:		0.21			0.17			0.36			0.15	
Level Of Service Module:												
Delay/Veh:	2.2	2.2	2.2	1.9	1.9	1.9	3.9	3.9	3.9	1.8	1.8	1.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	2.2	2.2	2.2	1.9	1.9	1.9	3.9	3.9	3.9	1.8	1.8	1.8
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:		2.2			1.9			3.9			1.8	
LOS by Appr:		A			A			A			A	

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project       Mon Oct 20, 1997 09:49:30                  Page 18-1
--------------------------------------------------------------------------------
                            Traffic Impact Analysis
                          F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
          1994 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #301 Evan Hewes & Drew
********************************************************************************
Cycle (sec):          1                Critical Vol./Cap. (X):         0.401
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):          4.1
Optimal Cycle:        0                Level Of Service:                   A
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17    30    21    19    19    20    21   134   133    24    69    24
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   17    30    21    19    19    20    21   134   133    24    69    24
Added Vol:      0     0    10    10     0     0     0    31     0    40   121    40
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   17    30    31    29    19    20    21   165   133    64   190    64
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    19    33    34    32    21    22    23   183   148    71   211    71
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   19    33    34    32    21    22    23   183   148    71   211    71
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:    19    33    34    32    21    22    23   183   148    71   211    71
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     244   244   244   323   323   323   441   441   441   483   483   483
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.22  0.38  0.40  0.43  0.28  0.29  0.13  1.03  0.84  0.40  1.20  0.40
Final Sat.:    54    94    96   138    90    95    57   456   369   194   577   194
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.35  0.35  0.35  0.23  0.23  0.23  0.40  0.40  0.40  0.37  0.37  0.37
Crit Moves:              ****        ****                    ****              ****
ApproachV/S:       0.35              0.23              0.40              0.37
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    3.8   3.8   3.8   2.4   2.4   2.4   4.6   4.6   4.6   4.0   4.0   4.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   3.8   3.8   3.8   2.4   2.4   2.4   4.6   4.6   4.6   4.0   4.0   4.0
LOS by Move:    A     A     A     A     A     A     A     A     A     A     A     A
ApproachDel:        3.8               2.4               4.6               4.0
LOS by Appr:          A                 A                 A                 A
********************************************************************************

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PM Cum + FA18 Project       Mon Oct 20, 1997 09:49:30                  Page 19-1
--------------------------------------------------------------------------------
                            Traffic Impact Analysis
                          F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
          1994 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #302 Evan Hewes & Bennett
********************************************************************************
Cycle (sec):          1                Critical Vol./Cap. (X):         0.944
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):          6.8
Optimal Cycle:        0                Level Of Service:                   B
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1     8     1   306    90    66    12   146     3     1    95    59
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    1     8     1   306    90    66    12   146     3     1    95    59
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     1     9     1   340   100    73    13   162     3     1   106    66
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    1     9     1   340   100    73    13   162     3     1   106    66
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:     1     9     1   340   100    73    13   162     3     1   106    66
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     299   299   299   466   466   466   232   232   232   184   184   184
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.09  0.82  0.09  0.77  0.23  1.00  1.00  0.98  0.02  0.01  0.99  1.00
Final Sat.:    27   245    27   360   106   466   232   228     4     2   182   184
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04  0.04  0.04  0.94  0.94  0.16  0.06  0.71  0.71  0.58  0.58  0.36
Crit Moves:              ****  ****                    ****              ****
ApproachV/S:       0.04              0.55              0.38              0.47
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    1.2   1.2   1.2  36.2  36.2   1.8   1.2  14.9  14.9   9.1   9.1   3.9
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   1.2   1.2   1.2  36.2  36.2   1.8   1.2  14.9  14.9   9.1   9.1   3.9
LOS by Move:    A     A     A     E     E     A     A     C     C     B     B     A
ApproachDel:        1.2               8.1               4.3               6.0
LOS by Appr:          A                 B                 A                 B
********************************************************************************

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project      Mon Oct 20, 1997 09:49:30                Page 20-1
-----------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                     Level Of Service Computation Report
           1994 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #302 Evan Hewes & Bennett
*****************************************************************************
Cycle (sec):          1                Critical Vol./Cap. (X):        3.484
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):      1592.1
Optimal Cycle:        0                Level Of Service:                  F
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1     8     1   306    90    66    12   146     3     1    95    59
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    1     8     1   306    90    66    12   146     3     1    95    59
Added Vol:      0    69     0   873   269   201    52     0     0     0     0   226
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    1    77     1  1179   359   267    64   146     3     1    95   285
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     1    86     1  1310   399   297    71   162     3     1   106   317
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    1    86     1  1310   399   297    71   162     3     1   106   317
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:     1    86     1  1310   399   297    71   162     3     1   106   317
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     488   488   488   581   581   581   199   199   199    91    91    91
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.01  0.98  0.01  0.77  0.23  1.00  1.00  0.98  0.02  0.01  0.99  1.00
Final Sat.:     6   477     6   445   136   581   199   195     4     1    90    91
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.18  0.18  0.18  2.94  2.94  0.51  0.36  0.83  0.83  1.18  1.18  3.48
Crit Moves:               ****        ****              ****                    ****
ApproachV/S:       0.18              1.73              0.59              2.33
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    2.0   2.0   2.0 71512  xxxx   7.0   3.9  23.4  23.4  87.2  87.2 xxxxx
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   2.0   2.0   2.0 71512  xxxx   7.0   3.9  23.4  23.4  87.2  87.2 xxxxx
LOS by Move:    A     A     A     F     F     B     A     D     D     F     F     F
ApproachDel:        2.0             706.3               9.5            6993.6
LOS by Appr:         A                F                 B                F
*****************************************************************************

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```

```
PM Cum + FA18 Project      Mon Oct 20, 1997 09:49:30                Page 21-1
-----------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                     Level Of Service Computation Report
            1994 HCM 4-Way Stop Method (Base Volume Alternative)
*****************************************************************************
Intersection #303 Evan Hewes & Forrester
*****************************************************************************
Cycle (sec):          1                Critical Vol./Cap. (X):        1.069
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):         9.4
Optimal Cycle:        0                Level Of Service:                  B
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      22    90    14    31   151    20    89   324    52    17   132    19
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   22    90    14    31   151    20    89   324    52    17   132    19
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    24   100    16    34   168    22    99   360    58    19   147    21
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   24   100    16    34   168    22    99   360    58    19   147    21
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:    24   100    16    34   168    22    99   360    58    19   147    21
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     335   335   335   355   355   355   391   391   391   331   331   331
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.17  0.72  0.11  0.15  0.75  0.10  1.00  0.86  0.14  1.00  0.88  0.12
Final Sat.:    57   239    38    54   266    35   391   337    54   331   290    41
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.42  0.42  0.42  0.63  0.63  0.63  0.25  1.07  1.07  0.06  0.51  0.51
Crit Moves:               ****        ****              ****                    ****
ApproachV/S:       0.42              0.63              0.66              0.28
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    4.9   4.9   4.9  11.0  11.0  11.0   2.6  58.1  58.1   1.2   6.9   6.9
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   4.9   4.9   4.9  11.0  11.0  11.0   2.6  58.1  58.1   1.2   6.9   6.9
LOS by Move:    A     A     A     C     C     C     A     F     F     A     B     B
ApproachDel:        4.9              11.0              12.3               2.9
LOS by Appr:         A                C                 C                 A
*****************************************************************************

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Table D-2
Traffic Impact Analysis: Cumulative AM and PM +F/A-18E/F Traffic *(continued)*

```
PM Cum + FA18 Project      Mon Oct 20, 1997 09:49:30              Page 22-1
------------------------------------------------------------------------------
                          Traffic Impact Analysis
                        F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          1994 HCM 4-Way Stop Method (Future Volume Alternative)
******************************************************************************
Intersection #303 Evan Hewes & Forrester
******************************************************************************
Cycle (sec):          1              Critical Vol./Cap. (X):         2.491
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):      280.7
Optimal Cycle:        0              Level Of Service:                   F
******************************************************************************
Approach:       North Bound      South Bound      East Bound      West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:       0  0  1! 0  0    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      22   90    14    31  151    20    89  324    52    17  132    19
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   22   90    14    31  151    20    89  324    52    17  132    19
Added Vol:     24    0     0     0    0    45   175  604    94     0  156     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   46   90    14    31  151    65   264  928   146    17  288    19
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:    51  100    16    34  168    72   293 1031   162    19  320    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   51  100    16    34  168    72   293 1031   162    19  320    21
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    51  100    16    34  168    72   293 1031   162    19  320    21
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     251  251   251   177  177   177   479  479   479   388  388   388
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.30 0.60  0.10  0.12 0.62  0.26  1.00 0.86  0.14  1.00 0.94  0.06
Final Sat.:    77  150    24    22  109    47   479  414    65   388  364    24
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.67 0.67  0.67  1.55 1.55  1.55  0.61 2.49  2.49  0.05 0.88  0.88
Crit Moves:       ****              ****              ****              ****
ApproachV/S:      0.67              1.55              1.55              0.46
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   12.5 12.5  12.5 358.7  359 358.7  10.2 xxxx 12891   1.2 28.2  28.2
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  12.5 12.5  12.5 358.7  359 358.7  10.2 xxxx 12891   1.2 28.2  28.2
LOS by Move:    C    C     C     F    F     F     C    F     F     A    D     D
ApproachDel:      12.5             358.7             363.0              5.8
LOS by Appr:        C                F                 F                 B
******************************************************************************

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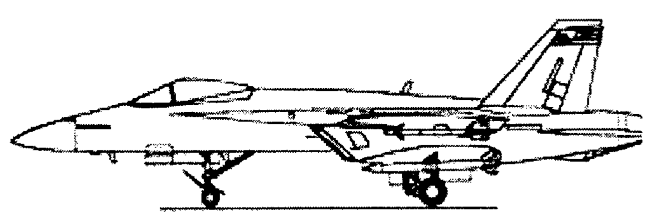

AM AND PM MITIGATION PLUS F/A-18E/F TRAFFIC

Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic

```
MITIG8 - PM Existing + FA18Mon Oct 20, 1997 10:32:20                Page 1-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #104 SR 41 & Grangeville
******************************************************************************
Cycle (sec):         90              Critical Vol./Cap. (X):         0.755
Loss Time (sec):      9 (Y+R =  9 sec) Average Delay (sec/veh):       24.5
Optimal Cycle:       77              Level Of Service:                   C
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected         Permitted        Permitted
Rights:           Include          Include           Include          Include
Min. Green:   18   30    30     3   15    15    35   35    35    35   35    35
Lanes:        1  0  2  0  1    1  0  2  0  1    0  1  0  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     109  254    21    18  198    33   166  191    31    35  101    16
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  109  254    21    18  198    33   166  191    31    35  101    16
Added Vol:     24    0     0     0    0    18    74  150    96     0   38     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  133  254    21    18  198    51   240  341   127    35  139    16
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:   148  282    23    20  220    57   267  379   141    39  154    18
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  148  282    23    20  220    57   267  379   141    39  154    18
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00  1.00 1.05  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   148  296    23    20  231    57   267  379   141    39  154    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.98  0.83  0.93 0.98  0.83  0.64 0.64  0.83  0.49 0.49  0.83
Lanes:       1.00 2.00  1.00  1.00 2.00  1.00  0.41 0.59  1.00  0.20 0.80  1.00
Final Sat.:  1770 3725  1583  1770 3725  1583   500  710  1583   188  743  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.08 0.08  0.01  0.01 0.06  0.04  0.53 0.53  0.09  0.21 0.21  0.01
Crit Moves:  ****                  ****             ****
Green/Cycle: 0.20 0.33  0.33  0.03 0.17  0.17  0.53 0.53  0.53  0.53 0.53  0.53
Volume/Cap:  0.42 0.24  0.04  0.34 0.37  0.22  1.00 1.00  0.17  0.39 0.39  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   20.8 14.1  13.1  28.8 21.7  21.0  40.9 40.9   7.0   8.3  8.3   6.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  20.8 14.1  13.1  28.8 21.7  21.0  40.9 40.9   7.0   8.3  8.3   6.4
Queue:          3    5     0     1    5     1    11   14     2     1    2     0
******************************************************************************
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```

Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic *(continued)*

```
MITIG8 - AM Existing + FA18Mon Oct 20, 1997 10:49:28                Page 1-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
           1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #302 Evan Hewes & Bennett
******************************************************************************
Cycle (sec):        100              Critical Vol./Cap. (X):        0.811
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):      12.5
Optimal Cycle:       76              Level Of Service:                  B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:       0  0  1  0  0   1  0  0  1  0   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   27     0    25   10    11    17   90     1     0  131    85
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   27     0    25   10    11    17   90     1     0  131    85
Added Vol:      0  261     0   201   62    46   196    0     0     0    0   848
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  288     0   226   72    57   213   90     1     0  131   933
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     0  320     0   251   80    63   237  100     1     0  146  1037
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0  320     0   251   80    63   237  100     1     0  146  1037
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     0  320     0   251   80    63   237  100     1     0  146  1037
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  0.99 0.93  0.93  0.64 1.00  1.00  1.00 1.00  0.85
Lanes:       0.00 1.00  0.00  1.00 0.56  0.44  1.00 0.99  0.01  0.00 1.00  1.00
Final Sat.:     0 1900     0  1881  989   778  1216 1881    19     0 1900  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.17  0.00  0.13 0.08  0.08  0.19 0.05  0.05  0.00 0.08  0.64
Crit Moves:       ****                                                     ****
Green/Cycle: 0.00 0.21  0.00  0.21 0.21  0.21  0.79 0.79  0.79  0.00 0.79  0.79
Volume/Cap:  0.00 0.81  0.00  0.64 0.39  0.39  0.25 0.07  0.07  0.00 0.10  0.81
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    0.0 32.6   0.0  25.9 22.4  22.4   1.8  1.5   1.5   0.0  1.5   6.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 32.6   0.0  25.9 22.4  22.4   1.8  1.5   1.5   0.0  1.5   6.7
Queue:          0   10     0     7    2     2     2    1     0     0    1    18
******************************************************************************
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```

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MITIG8 - PM Existing + FA18Mon Oct 20, 1997 10:52:31                Page 1-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
           1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #302 Evan Hewes & Bennett
******************************************************************************
Cycle (sec):        100              Critical Vol./Cap. (X):        0.930
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):      16.3
Optimal Cycle:      180              Level Of Service:                  C
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:       0  0  1! 0  0   1  0  0  1  0   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1    1     1   116   32    22     7  146     3     1   95    34
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    1    1     1   116   32    22     7  146     3     1   95    34
Added Vol:      0   69     0   873  269   201    52    0     0     0    0   226
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1   70     1   989  301   223    59  146     3     1   95   260
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     1   78     1  1099  334   248    66  162     3     1  106   289
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    1   78     1  1099  334   248    66  162     3     1  106   289
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:     1   78     1  1099  334   248    66  162     3     1  106   289
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.89 0.89  0.89  0.77 0.94  0.94  0.53 1.00  1.00  1.00 1.00  0.85
Lanes:       0.01 0.98  0.01  1.00 0.57  0.43  1.00 0.98  0.02  0.01 0.99  1.00
Final Sat.:    21 1651    21  1463 1025   761  1007 1865    35    18 1882  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.05 0.05  0.05  0.75 0.33  0.33  0.07 0.09  0.09  0.06 0.06  0.18
Crit Moves:                   ****                                         ****
Green/Cycle: 0.81 0.81  0.81  0.81 0.81  0.81  0.19 0.19  0.19  0.19 0.19  0.19
Volume/Cap:  0.06 0.06  0.06  0.93 0.40  0.40  0.34 0.45  0.45  0.29 0.29  0.93
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    1.3  1.3   1.3  14.1  1.9   1.9  23.0 23.7  23.7  22.5 22.5  49.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   1.3  1.3   1.3  14.1  1.9   1.9  23.0 23.7  23.7  22.5 22.5  49.6
Queue:          0    0     0    28    3     2     2    4     0     0    3    11
******************************************************************************
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```

Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic *(continued)*

```
MITIG8 - AM Existing + FA18Mon Oct 20, 1997 10:51:23            Page 1-1
--------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
**************************************************************************
Intersection #303 Evan Hewes & Forrester
**************************************************************************
Cycle (sec):        100              Critical Vol./Cap. (X):       0.877
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):      15.4
Optimal Cycle:      117              Level Of Service:                C
**************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0      0    0    0      0    0    0      0    0    0
Lanes:        0  0  1!  0  0   0  0  1!  0  0   1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      15   65   11     30  107   38     22  156   17    104  110   12
Growth Adj:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:   15   65   11     30  107   38     22  156   17    104  110   12
Added Vol:     91    0    0      0    0  170     40  139   22      0  587    0
PasserByVol:    0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:  106   65   11     30  107  208     62  295   39    104  697   12
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:   118   72   12     33  119  231     69  328   43    116  774   13
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:  118   72   12     33  119  231     69  328   43    116  774   13
PCE Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:   118   72   12     33  119  231     69  328   43    116  774   13
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900   1900 1900 1900   1900 1900 1900   1900 1900 1900
Adjustment:  0.39 0.39 0.39   0.78 0.78 0.78   0.06 0.98 0.98   0.36 1.00 1.00
Lanes:       0.58 0.36 0.06   0.09 0.31 0.60   1.00 0.88 0.12   1.00 0.98 0.02
Final Sat.:   435  265   44    128  460  893    114 1646  216    684 1869   31
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.27 0.27 0.27   0.26 0.26 0.26   0.61 0.20 0.20   0.17 0.41 0.41
Crit Moves:       ****                         ****
Green/Cycle: 0.31 0.31 0.31   0.31 0.31 0.31   0.69 0.69 0.69   0.69 0.69 0.69
Volume/Cap:  0.88 0.88 0.88   0.84 0.84 0.84   0.88 0.29 0.29   0.25 0.60 0.60
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   41.4 41.4 41.4   29.5 29.5 29.5   49.9  3.9  3.9    3.8  5.9  5.9
User DelAdj: 1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:  41.4 41.4 41.4   29.5 29.5 29.5   49.9  3.9  3.9    3.8  5.9  5.9
Queue:          5    3    1      2    4    7      3    4    0      1   12    0
**************************************************************************
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```

```
MITIG8 - PM Existing + FA18Mon Oct 20, 1997 10:53:12            Page 1-1
--------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
--------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
**************************************************************************
Intersection #303 Evan Hewes & Forrester
**************************************************************************
Cycle (sec):        100              Critical Vol./Cap. (X):       0.724
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):       8.9
Optimal Cycle:       52              Level Of Service:                B
**************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0      0    0    0      0    0    0      0    0    0
Lanes:        0  0  1!  0  0   0  0  1!  0  0   1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      19   90   14     31  151   15     51  193   31     17  115   19
Growth Adj:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:   19   90   14     31  151   15     51  193   31     17  115   19
Added Vol:     24    0    0      0    0   45    175  604   94      0  156    0
PasserByVol:    0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:   43   90   14     31  151   60    226  797  125     17  271   19
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90   0.90 0.90 0.90
PHF Volume:    48  100   16     34  168   67    251  886  139     19  301   21
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:   48  100   16     34  168   67    251  886  139     19  301   21
PCE Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:    48  100   16     34  168   67    251  886  139     19  301   21
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900   1900 1900 1900   1900 1900 1900   1900 1900 1900
Adjustment:  0.65 0.65 0.65   0.82 0.82 0.82   0.41 0.98 0.98   0.06 0.99 0.99
Lanes:       0.29 0.61 0.10   0.13 0.62 0.25   1.00 0.86 0.14   1.00 0.93 0.07
Final Sat.:   361  753  120    196  970  387    779 1609  253    114 1758  123
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.13 0.13 0.13   0.17 0.17 0.17   0.32 0.55 0.55   0.17 0.17 0.17
Crit Moves:                        ****              ****
Green/Cycle: 0.24 0.24 0.24   0.24 0.24 0.24   0.76 0.76 0.76   0.76 0.76 0.76
Volume/Cap:  0.56 0.56 0.56   0.72 0.72 0.72   0.42 0.72 0.72   0.22 0.23 0.23
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   23.3 23.3 23.3   27.3 27.3 27.3    3.0  5.4  5.4    2.4  2.2  2.2
User DelAdj: 1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:  23.3 23.3 23.3   27.3 27.3 27.3    3.0  5.4  5.4    2.4  2.2  2.2
Queue:          1    3    1      1    5    2      3   14    3      0    2    0
**************************************************************************
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Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic *(continued)*

```
MITIG8 - AM Cum + FA18 ProjMon Oct 20, 1997 17:18:43                  Page 1-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #101 Jackson & Main Gate
******************************************************************************
Cycle (sec):         120               Critical Vol./Cap. (X):        0.945
Loss Time (sec):      12 (Y+R =  3 sec) Average Delay (sec/veh):       24.3
Optimal Cycle:       152               Level Of Service:                  C
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:          Include          Include          Include           Ovl
Min. Green:    3     3     3    4     4     4    3    53    53    5    55    55
Lanes:        0  1  0  0  1    1  0  0  1  1    1  0  1  0  1    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      2     6     4   61     6     8    8    72     2   10   150   865
Growth Adj: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:   2     6     4   61     6     8    8    72     2   10   150   865
Added Vol:     0     0     0   74     0     2    7     0     0    0     0   326
PasserByVol:   0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:   2     6     4  135     6    10   15    72     2   10   150  1191
User Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:    0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90
PHF Volume:    2     7     4  150     7    11   17    80     2   11   167  1323
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   2     7     4  150     7    11   17    80     2   11   167  1323
PCE Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:    1.00  1.00  1.00 1.00  1.05  1.05 1.00  1.00  1.00 1.00  1.00  1.00
Final Vol.:    2     7     4  150     7    12   17    80     2   11   167  1323
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900  1900
Adjustment: 0.97  0.97  0.83 0.93  0.89  0.89 0.93  0.98  0.83 0.93  0.98  0.83
Lanes:      0.22  0.78  1.00 1.00  0.74  1.26 1.00  1.00  1.00 1.00  1.00  1.00
Final Sat.:  410  1434  1583 1770  1249  2141 1770  1863  1583 1770  1863  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.00  0.00  0.00 0.08  0.01  0.01 0.01  0.04  0.00 0.01  0.09  0.84
Crit Moves:       ****       ****             ****                         ****
Green/Cycle: 0.03 0.03  0.03 0.09  0.09  0.09 0.03  0.72  0.72 0.07  0.76  0.85
Volume/Cap: 0.20  0.20  0.10 0.98  0.06  0.06 0.38  0.06  0.00 0.09  0.12  0.98
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:  37.3  37.3  37.0 86.3  32.5  32.5 39.9   3.2   3.0 33.9   2.4  20.8
User DelAdj: 1.00 1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh: 37.3  37.3  37.0 86.3  32.5  32.5 39.9   3.2   3.0 33.9   2.4  20.8
Queue:         0     0     0    8     0     0    1     1     0    0     1    48
******************************************************************************
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```

```
MITIG8 - PM Cum + FA18 ProjMon Oct 20, 1997 17:20:19                  Page 1-1
------------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #101 Jackson & Main Gate
******************************************************************************
Cycle (sec):         120               Critical Vol./Cap. (X):        0.508
Loss Time (sec):      12 (Y+R =  3 sec) Average Delay (sec/veh):       12.9
Optimal Cycle:        80               Level Of Service:                  B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:          Include          Include          Include           Ovl
Min. Green:    2     2     2   25    25    25    4    39    39    2    37    37
Lanes:        0  1  0  0  1    1  1  0  0  1    1  0  1  0  1    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      3     6     4  671     6    14    6   195     2    2   141   140
Growth Adj: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:   3     6     4  671     6    14    6   195     2    2   141   140
Added Vol:     0     0     0  336     0     7    2     0     0    0     0    84
PasserByVol:   0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:   3     6     4 1007     6    21    8   195     2    2   141   224
User Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:    0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90
PHF Volume:    3     7     4 1119     7    23    9   217     2    2   157   249
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   3     7     4 1119     7    23    9   217     2    2   157   249
PCE Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:    1.00  1.00  1.00 1.05  1.05  1.00 1.00  1.00  1.00 1.00  1.05  1.00
Final Vol.:    3     7     4 1175     7    23    9   217     2    2   165   249
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900  1900
Adjustment: 0.97  0.97  0.83 0.93  0.93  0.83 0.93  0.98  0.83 0.93  0.98  0.83
Lanes:      0.30  0.70  1.00 1.99  0.01  1.00 1.00  1.00  1.00 1.00  2.00  1.00
Final Sat.:  553  1291  1583 3518    21  1583 1770  1863  1583 1770  3725  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01  0.01  0.00 0.33  0.33  0.01 0.01  0.12  0.00 0.00  0.04  0.16
Crit Moves:       ****             ****             ****       ****
Green/Cycle: 0.02 0.02  0.02 0.54  0.54  0.54 0.03  0.33  0.33 0.02  0.31  0.85
Volume/Cap: 0.33  0.33  0.15 0.62  0.62  0.03 0.15  0.36  0.00 0.07  0.14  0.19
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:  39.8  39.8  37.8 12.7  12.7   8.3 36.5  20.2  17.7 37.5  19.4   1.0
User DelAdj: 1.00 1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh: 39.8  39.8  37.8 12.7  12.7   8.3 36.5  20.2  17.7 37.5  19.4   1.0
Queue:         0     0     0   27     0     0    0     6     0    0     4     1
******************************************************************************
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Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic *(continued)*

```
MITIG8 - AM Cum + FA18 ProjMon Oct 20, 1997 17:30:16                Page 1-1
-----------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #104 SR 41 & Grangeville
*****************************************************************************
Cycle (sec):          80                Critical Vol./Cap. (X):        0.958
Loss Time (sec):       9 (Y+R =  9 sec) Average Delay (sec/veh):        23.8
Optimal Cycle:       124                Level Of Service:                  C
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    22   30    30    0   10    10    0    0     0    0    0     0
Lanes:         1  0  2  0  1    1  0  2  0  1    1  0  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     302  239    17    9  284    82   66   47    20   24  316    14
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  302  239    17    9  284    82   66   47    20   24  316    14
Added Vol:     94    0     0    0    0    72   17   34    22    0  147     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  396  239    17    9  284   154   83   81    42   24  463    14
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:   440  266    19   10  316   171   92   90    47   27  514    16
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  440  266    19   10  316   171   92   90    47   27  514    16
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00 1.00 1.05  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Final Vol.:   440  279    19   10  331   171   92   90    47   27  514    16
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.98  0.83 0.93 0.98  0.83 0.10 0.98  0.83 0.96 0.96  0.83
Lanes:       1.00 2.00  1.00 1.00 2.00  1.00 1.00 1.00  1.00 0.05 0.95  1.00
Final Sat.:  1770 3725  1583 1770 3725  1583  186 1863  1583   91 1734  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.25 0.07  0.01 0.01 0.09  0.11 0.49 0.05  0.03 0.30 0.30  0.01
Crit Moves:  ****                       **** ****
Green/Cycle: 0.28 0.38  0.38 0.03 0.13  0.13 0.49 0.49  0.49 0.49 0.49  0.49
Volume/Cap:  0.90 0.20  0.03 0.23 0.71  0.86 1.01 0.10  0.06 0.61 0.61  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   32.4 10.9  10.2 25.2 25.2  43.0 90.6  7.1   7.0 10.5 10.5   6.9
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  32.4 10.9  10.2 25.2 25.2  43.0 90.6  7.1   7.0 10.5 10.5   6.9
Queue:         12    4     0    0    8     5    5    1     1    1    9     0
*****************************************************************************
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MITIG8 - PM Cum + FA18 ProjMon Oct 20, 1997 17:31:36                Page 1-1
-----------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #104 SR 41 & Grangeville
*****************************************************************************
Cycle (sec):          80                Critical Vol./Cap. (X):        0.560
Loss Time (sec):       9 (Y+R =  9 sec) Average Delay (sec/veh):        12.6
Optimal Cycle:        77                Level Of Service:                  B
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    18   30    30    3   15    15   35   35    35   35   35    35
Lanes:         1  0  2  0  1    1  0  2  0  1    1  0  1  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     115  327    26   18  278    39  197  254    73   40  110    16
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  115  327    26   18  278    39  197  254    73   40  110    16
Added Vol:     24    0     0    0    0    18   74  150    96    0   38     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  139  327    26   18  278    57  271  404   169   40  148    16
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:   154  363    29   20  309    63  301  449   188   44  164    18
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  154  363    29   20  309    63  301  449   188   44  164    18
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.05  1.00 1.00 1.05  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Final Vol.:   154  382    29   20  324    63  301  449   188   44  164    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.98  0.83 0.93 0.98  0.83 0.49 0.98  0.83 0.61 0.61  0.83
Lanes:       1.00 2.00  1.00 1.00 2.00  1.00 1.00 1.00  1.00 0.21 0.79  1.00
Final Sat.:  1770 3725  1583 1770 3725  1583  931 1863  1583  244  911  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 0.10  0.02 0.01 0.09  0.04 0.32 0.24  0.12 0.18 0.18  0.01
Crit Moves:  ****                  ****      ****
Green/Cycle: 0.23 0.38  0.38 0.04 0.19  0.19 0.48 0.48  0.48 0.48 0.48  0.48
Volume/Cap:  0.39 0.27  0.05 0.30 0.46  0.21 0.68 0.51  0.25 0.38 0.38  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   17.3 11.3  10.3 25.0 19.0  17.8 13.4  9.8   8.1  8.9  8.9   7.2
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  17.3 11.3  10.3 25.0 19.0  17.8 13.4  9.8   8.1  8.9  8.9   7.2
Queue:          3    6     0    0    6     1    6    7     2    1    2     0
*****************************************************************************
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Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic *(continued)*

```
MITIG8 - AM Cum + FA18 ProjMon Oct 20, 1997 17:49:16                Page 1-1
------------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
              1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #302 Evan Hewes & Bennett
******************************************************************************
Cycle (sec):        100               Critical Vol./Cap. (X):        0.657
Loss Time (sec):      9 (Y+R =  4 sec) Average Delay (sec/veh):       18.7
Optimal Cycle:       46               Level Of Service:                 C
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Protected        Permitted        Permitted
Rights:          Include          Include          Include           Ignore
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  1  0  0   1  0  1  0  1   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0    84     0   45    16    16   60    90     1    0   131   272
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
Initial Bse:   0    84     0   45    16    16   60    90     1    0   131     0
Added Vol:     0   261     0  201    62    46  196     0     0    0     0   848
PasserByVol:   0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:   0   345     0  246    78    62  256    90     1    0   131     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.00
PHF Volume:    0   383     0  273    87    69  284   100     1    0   146     0
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   0   383     0  273    87    69  284   100     1    0   146     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
Final Vol.:    0   383     0  273    87    69  284   100     1    0   146     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 1.00  1.00 0.95 1.00  0.85 0.61 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 1.00  0.00 1.00 1.00  1.00 1.00 0.99  0.01 0.00 1.00  1.00
Final Sat.:     0 1900     0 1805 1900  1615 1159 1881    19    0 1900  1900
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.20  0.00 0.15 0.05  0.04 0.25 0.05  0.05 0.00 0.08  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.30  0.00 0.23 0.53  0.53 0.38 0.38  0.38 0.00 0.38  0.00
Volume/Cap:  0.00 0.67  0.00 0.67 0.09  0.08 0.64 0.14  0.14 0.00 0.20  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:    0.0 21.7   0.0 25.6  7.5   7.5 18.7 13.1  13.1  0.0 13.5   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 21.7   0.0 25.6  7.5   7.5 18.7 13.1  13.1  0.0 13.5   0.0
Queue:          0   10     0    7    1     1    7    2     0    0    3     0
******************************************************************************
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MITIG8 - PM Cum + FA18 ProjMon Oct 20, 1997 17:47:01                Page 1-1
------------------------------------------------------------------------------
                        Traffic Impact Analysis
                      F/A-18 E/F Squadron  Siting
------------------------------------------------------------------------------
                     Level Of Service Computation Report
              1994 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #302 Evan Hewes & Bennett
******************************************************************************
Cycle (sec):        100               Critical Vol./Cap. (X):        0.956
Loss Time (sec):      9 (Y+R =  4 sec) Average Delay (sec/veh):       21.4
Optimal Cycle:      143               Level Of Service:                 C
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Protected        Permitted        Permitted
Rights:          Include          Include          Include           Ignore
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  1! 0  0   1  0  1  0  1   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      1     8     1  306    90    66   12   146     3    1    95    59
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
Initial Bse:   1     8     1  306    90    66   12   146     3    1    95     0
Added Vol:     0    69     0  873   269   201   52     0     0    0     0   226
PasserByVol:   0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:   1    77     1 1179   359   267   64   146     3    1    95     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.00
PHF Volume:    1    86     1 1310   399   297   71   162     3    1   106     0
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   1    86     1 1310   399   297   71   162     3    1   106     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00
Final Vol.:    1    86     1 1310   399   297   71   162     3    1   106     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.81 0.81  0.81 0.95 1.00  0.85 0.52 1.00  1.00 0.92 0.92  1.00
Lanes:       0.01 0.98  0.01 1.00 1.00  1.00 1.00 0.98  0.02 0.01 0.99  1.00
Final Sat.:    17 1504    17 1805 1900  1615  988 1865    35   16 1732  1900
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.06  0.06 0.73 0.21  0.18 0.07 0.09  0.09 0.06 0.06  0.00
Crit Moves:       ****       ****                 ****
Green/Cycle: 0.05 0.05  0.05 0.76 0.81  0.81 0.10 0.10  0.10 0.10 0.10  0.00
Volume/Cap:  1.07 1.07  1.07 0.96 0.26  0.23 0.72 0.87  0.87 0.61 0.61  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:  133.6  134 133.6 18.5  1.5   1.4 42.9 51.4  51.4 32.3 32.3   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 133.6  134 133.6 18.5  1.5   1.4 42.9 51.4  51.4 32.3 32.3   0.0
Queue:          0    5     0   38    3     2    2    6     0    0    3     0
******************************************************************************
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Table D-3
Traffic Impact Analysis: Mitigation AM and PM + F/A-18E/F Traffic *(continued)*

```
MITIG8 - AM Cum + FA18 ProjMon Oct 20, 1997 17:50:08                Page 1-1
-----------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #303 Evan Hewes & Forrester
*****************************************************************************
Cycle (sec):         100              Critical Vol./Cap. (X):        0.975
Loss Time (sec):       6 (Y+R =  4 sec) Average Delay (sec/veh):       22.9
Optimal Cycle:       173              Level Of Service:                  C
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  1!  0  0   0  0  1!  0  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     35    65    11    30   107    76    26   170    19   104   239    12
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:  35    65    11    30   107    76    26   170    19   104   239    12
Added Vol:    91     0     0     0     0   170    40   139    22     0   587     0
PasserByVol:   0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut: 126    65    11    30   107   246    66   309    41   104   826    12
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:  140    72    12    33   119   273    73   343    46   116   918    13
Reduct Vol:    0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol: 140    72    12    33   119   273    73   343    46   116   918    13
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:  140    72    12    33   119   273    73   343    46   116   918    13
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.32  0.32  0.32  0.77  0.77  0.77  0.07  0.98  0.98  0.33  1.00  1.00
Lanes:       0.63  0.32  0.05  0.08  0.28  0.64  1.00  0.88  0.12  1.00  0.99  0.01
Final Sat.:  380   196    33   114   409   939   133  1642   220   627  1873    27
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.37  0.37  0.37  0.29  0.29  0.29  0.55  0.21  0.21  0.19  0.49  0.49
Crit Moves:        ****                          ****
Green/Cycle: 0.38  0.38  0.38  0.38  0.38  0.38  0.56  0.56  0.56  0.56  0.56  0.56
Volume/Cap:  0.98  0.98  0.98  0.77  0.77  0.77  0.98  0.37  0.37  0.33  0.87  0.87
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   58.9  58.9  58.9  22.2  22.2  22.2  84.9   7.9   7.9   7.8  17.8  17.8
User DelAdj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  58.9  58.9  58.9  22.2  22.2  22.2  84.9   7.9   7.9   7.8  17.8  17.8
Queue:          6     4     1     1     4     8     4     5     1     2    24     1
*****************************************************************************
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MITIG8 - PM Cum + FA18 ProjMon Oct 20, 1997 17:51:09                Page 1-1
-----------------------------------------------------------------------------
                         Traffic Impact Analysis
                       F/A-18 E/F Squadron  Siting
-----------------------------------------------------------------------------
                    Level Of Service Computation Report
          1994 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #303 Evan Hewes & Forrester
*****************************************************************************
Cycle (sec):         100              Critical Vol./Cap. (X):        0.871
Loss Time (sec):       6 (Y+R =  4 sec) Average Delay (sec/veh):       14.0
Optimal Cycle:        80              Level Of Service:                  B
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  1!  0  0   0  0  1!  0  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     22    90    14    31   151    20    89   324    52    17   132    19
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:  22    90    14    31   151    20    89   324    52    17   132    19
Added Vol:    24     0     0     0     0    45   175   604    94     0   156     0
PasserByVol:   0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:  46    90    14    31   151    65   264   928   146    17   288    19
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:   51   100    16    34   168    72   293  1031   162    19   320    21
Reduct Vol:    0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  51   100    16    34   168    72   293  1031   162    19   320    21
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:   51   100    16    34   168    72   293  1031   162    19   320    21
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.56  0.56  0.56  0.81  0.81  0.81  0.41  0.98  0.98  0.05  0.99  0.99
Lanes:       0.30  0.60  0.10  0.12  0.62  0.26  1.00  0.86  0.14  1.00  0.94  0.06
Final Sat.:  325   638   102   191   942   404   779  1609   253    95  1765   116
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.16  0.16  0.16  0.18  0.18  0.18  0.38  0.64  0.64  0.20  0.18  0.18
Crit Moves:                          ****              ****
Green/Cycle: 0.20  0.20  0.20  0.20  0.20  0.20  0.74  0.74  0.74  0.74  0.74  0.74
Volume/Cap:  0.77  0.77  0.77  0.87  0.87  0.87  0.51  0.87  0.87  0.27  0.25  0.25
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Delay/Veh:   34.3  34.3  34.3  40.4  40.4  40.4   4.3  10.9  10.9   3.4   2.8   2.8
User DelAdj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  34.3  34.3  34.3  40.4  40.4  40.4   4.3  10.9  10.9   3.4   2.8   2.8
Queue:          2     3     1     2     6     3     4    23     5     0     3     0
*****************************************************************************
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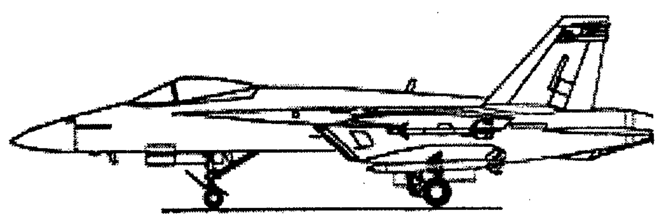

APPENDIX E
AIR QUALITY/CONFORMITY DETERMINATION

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APPENDIX E
AIR QUALITY/CONFORMITY DETERMINATION

E.1 INTRODUCTION

This appendix contains documentation for the air quality analyses presented in Chapter 4 of the EIS. In addition, this appendix contains a discussion of Clean Air Act conformity requirements promulgated by the US Environmental Protection Agency (EPA); a final draft conformity determination for the NAS Lemoore Alternative; and a preliminary draft conformity determination for the NAF El Centro Alternative.

Extensive tabular summaries of data and emissions analyses are presented as a series of attachments to this appendix. For convenience, these attachments are grouped by emission source categories. Most tables in the attachments include footnotes and data source references that further explain the details of the emission estimates.

E.2 PROCEDURES USED FOR EMISSION ESTIMATES

Emissions analyses are used as the basis for most National Environmental Policy Act (NEPA) impact evaluations and as the basis for the Clean Air Act conformity analysis. Emissions analyses used for NEPA impact assessment purposes are broader than those used for conformity determination purposes. Conformity analyses address only those emission categories that remain subject to federal agency control. NEPA impact air quality assessments also address other emission categories (such as non-work personal vehicle travel) which are not subject to federal agency control). The description of analysis procedures used for different categories of emission sources identifies the types of emission sources included only in NEPA impact analyses.

E.2.1 Construction Activity

Emission estimates for facility construction activities account for fugitive dust from construction sites plus exhaust emissions from heavy construction equipment. Site disturbance and heavy equipment use will be important only for

new construction or facility expansion. Interior building renovations and the interior finishing stage of building construction are assumed to have minimal air quality impacts.

All aircraft-related and training-related facilities would be the focus of initial construction efforts. Housing facilities and personnel support facilities would be phased in on a more extended construction schedule. The NAS Lemoore Alternative would require the least amount of construction. The second phase of F/A-18E/F aircraft arrivals would be replacements for existing aircraft at NAS Lemoore, and thus would not require additional facility construction. The second phase of F/A-18E/F aircraft arrivals would be entirely new aircraft for NAF El Centro, and thus would require additional new facility construction for that alternative.

Construction site acreages were estimated from building size estimates, with most structures assumed to be single story construction. Disturbed areas for construction sites were estimated to occupy as much as twice the facility footprint for facilities other than housing. Construction sites for housing facilities were estimated to occupy four times the area of the facility footprint (thus accounting for parking facilities, landscaped areas, and internal roadways).

Emission estimates for facility construction were developed by splitting the overall construction activity into two phases: site and foundation preparation, and facility construction. The entire construction site was assumed to be disturbed during site and foundation preparation. Only areas outside the facility footprint would be subject to disturbance during the actual building construction phase. Site disturbance activities are assumed to be concentrated in the year when construction is initiated.

Table E-1 presents construction site acreage estimates for the NAS Lemoore Alternative. Tables E-2 through E-9 present construction emission estimates for the NAS Lemoore Alternative during 1999 through 2002. Table E-10 presents construction site acreage estimates for the NAF El Centro Alternative. Construction activities for the first phase of F/A-18E/F aircraft arrivals would begin in 1999 and continue through 2002. Construction activities for the second phase of F/A-18E/F aircraft arrivals under the NAF El Centro Alternative would begin in 2005 and continue through 2009. Tables E-11 through E-28 present construction emission estimates for the NAF El Centro Alternative.

Construction emission estimates are based on data and procedures outlined in U.S. Environmental Protection Agency (1985a, 1995). Available fugitive dust emission factors for generalized construction activity are based on data collected with total suspended particulate (TSP) matter sampling equipment. TSP samplers collect a broader range of particle sizes than those collected by PM_{10} samplers. PM_{10} samplers collect particles with aerodynamic equivalent diameters smaller than 45-50 microns (40 CFR 53.43). The "10" in PM_{10} is not a size limit; it is the

particle size class (9.5-10.5 microns aerodynamic equivalent diameter) collected with a sampling efficiency of 50 percent by mass.

The PM_{10} portion of fugitive dust is estimated as being somewhat less than the silt plus clay fraction of typical soils, with additional emission rate adjustments for the effectiveness of anticipated dust control practices. The resulting emission rate is about 10.8 pounds per acre-day of construction activity for the NAS Lemoore Alternative and 8 pounds per acre-day of construction activity for the NAF El Centro Alternative. Construction equipment exhaust emission rates are taken from U.S. Environmental Protection Agency (1985b). Construction equipment and fugitive dust emission rate assumptions are summarized in Table E-29.

E.2.2 F/A-18 Aircraft Operations

Aircraft emission estimates have been prepared in a manner consistent with procedures outlined in U.S. Environmental Protection Agency (1992). To be consistent with normal emission inventory procedures, only emission released within 3,000 feet of ground level are included in the emissions analyses.

Phase 1 and Phase 2 Flight Activity Estimates. Aircraft emission estimates require categorizing flight operations into takeoffs, landings, and various practice patterns that have different durations and power setting mixes. Four types of practice patterns are used for the analyses presented in this EIS: touch-and-go patterns, field carrier landing practice (FCLP) patterns, ground controlled approach (GCA) patterns, and automated carrier landing system (ACLS) patterns. Landings are categorized into two categories: straight-in landings, and overhead break pattern landings. An overhead break landing includes a flyover of the airfield, followed by a loop back into the normal landing approach.

Different types of F/A-18 aircraft squadrons have different mixes of flight operations, and thus need to be evaluated separately. A fleet replacement squadron (FRS) trains new pilots and provides refresher course training to existing pilots. Fleet squadrons are strike fighter squadrons that periodically deploy to aircraft carriers for active sea duty. All existing F/A-18 strike fighter squadrons assigned to the Pacific Fleet are based at NAS Lemoore or in Japan.

Table E-30 summarizes the expected mixture of annual flight operations at the home airfield by F/A-18E/F aircraft. Separate estimates are presented in Table E-30 for Phase 1 fleet squadrons, Phase 2 fleet squadrons, and the FRS squadron. The annual number of flight operations reflects normal deployment rotations for fleet squadrons and temporary detachments to training ranges or other locations. The FRS and Phase 1 fleet squadron data in Table E-30 are taken from an independent naval aviation simulation model (NASMOD) report (ATAC Corporation 1997) that evaluated airfield and airspace utilization scenarios at NAS Lemoore. The Phase 2 fleet squadron operation numbers are extrapolated from the Phase 1 fleet squadron operations on a per-aircraft basis (56 Phase 1 fleet squadron aircraft versus an additional 72 Phase 2 fleet squadron aircraft).

The NASMOD report presents flight operation numbers using two different methods of categorizing the data. A "basic operations" format is used for airfield and airspace utilization modeling. The basic operations summaries categorize data as departures, visual landings, instrument landings, visual touch-and-go/low approaches, instrument touch-and-go/low approaches, FCLP operations, and ACLS operations. "Departures" as used for the basic operations tabulation represent all takeoffs, regardless of the flight destination. Similarly, "landings" as used in the basic operations tabulation represent all landings, regardless of origin of the aircraft flight.

The NASMOD flight operations data also are presented as "flight track operations" for noise modeling purposes. The flight track operations summaries categorize the data as departures, overhead break arrivals, straight-in arrivals, visual touch-and-go patterns, GCA box patterns, FCLP patterns, and ACLS patterns. "Departures" and "arrivals" as used for the flight track operations tabulation are not equivalent to total takeoffs and landings. For purposes of the flight track operations summary, departures include only those takeoffs where the aircraft destination is beyond the area of local tower control. Similarly, the flight track operations definition of arrivals includes only those landings by aircraft flights that originated in or returned from locations outside the area of local tower control. Takeoffs and landings associated with local practice pattern events (FCLP, GCA box, ACLS, or touch-and-go patterns) are included in the pattern event numbers, not in departures and arrivals.

Flight operations data used for air quality analyses require a third form of categorization: total takeoffs, total overhead break landings, total straight-in landings, touch-and-go pattern cycles, FCLP pattern cycles, GCA box pattern cycles, and ACLS pattern cycles. Total takeoffs and landings were taken from the basic operations data in the NASMOD report, with landings partitioned into overhead break and straight-in categories based on the percentage breakdown shown in the flight track summaries. FCLP and ACLS pattern operations were taken directly from the basic operations summary. The basic operations summary also provided the estimates for touch-and-go patterns and GCA patterns. The instrument touch-and-go category in the basic operations summary represents GCA patterns while the visual touch-and-go category represents touch-and-go patterns as used for the air quality analysis.

Phase 1 would produce a maximum of 92 additional aircraft operating from NAS Lemoore or NAF El Centro in any one year. Under the NAS Lemoore Alternative, existing F/A-18C/D aircraft would continue operating at 1997 baseline activity levels. Phase 2 would increase the number of F/A-18E/F aircraft by 72, bringing the total number of F/A-18E/F aircraft to 164. For the NAS Lemoore Alternative, however, the 72 aircraft added during Phase 2 would be one-for-one replacements of existing F/A-18C/D aircraft already stationed at NAS Lemoore. For the NAF El Centro Alternative, all 164 F/A-18E/F aircraft would be new to the base.

Under the NAS Lemoore Alternative, Phase 2 of the F/A-18E/F aircraft arrivals would result in two changes to the existing F/A-18C/D squadrons. Six fleet squadrons of F/A-18C/Ds would be replaced by six fleet squadrons of F/A-18E/Fs. In addition, the existing F/A-18C/D FRS squadron would be reduced from 36 aircraft to 10 aircraft, with a proportionate change in annual FRS squadron flight operations. This change would occur because fewer pilots would need to be trained or given refresher courses in F/A-18C/D aircraft. Table E-31 summarizes the changes in F/A-18C/D aircraft operations that would occur during the two phases of F/A-18E/F aircraft introductions under the NAS Lemoore Alternative.

Intermediate Year Flight Operations. Impact assessments presented in this EIS have focused on conditions at the end of Phase 1 and Phase 2. Clean Air Act conformity requirements, however, require analyses of emissions for individual calendar years between the start of facility construction and full operational conditions. Phase 1 aircraft arrivals will be spread over four years (2000 through 2003). Phase 2 aircraft arrivals will be spread over six years (2005 through 2010).

In the case of the NAS Lemoore Alternative, Phase 2 will involve the arrival of 72 F/A-18E/F aircraft and the removal of 98 F/A-18C/D aircraft. In addition to the one-for-one replacement of 72 aircraft in six fleet squadrons, the existing F/A-18C/D FRS squadron at NAS Lemoore would be reduced in size without any corresponding increase in other aircraft.

Table E-32 presents a summary of aircraft arrival and removal phasing under the NAS Lemoore Alternative. Table E-33 summarizes aircraft arrival phasing for the NAF El Centro Alternative. The flight operations estimates in Tables E-32 and E-33 have been used to partition Phase 1 and Phase 2 aircraft emission estimates into the intermediate years for each phase of the proposed action.

Emissions From 1997 Baseline F/A-18C/D Operations. Under the NAS Lemoore Alternative, existing F/A-18C/D aircraft squadrons will continue their current level of operations throughout Phase 1. Emissions associated with this baseline level of flight operations have been estimated to provide a point of reference for evaluating emission changes introduced by the proposed action. The NASMOD report discussed previously (ATAC Corporation 1997) identifies 160 aircraft currently based at NAS Lemoore: 120 fleet squadron aircraft and 40 FRS squadron aircraft. The number of aircraft in the existing F/A-18C/D FRS squadron is somewhat more than the normal complement for an FRS squadron. The NASMOD report indicates that the existing F/A-18C/D FRS squadron will be reduced to 36 aircraft with no reduction in overall flight operations. Consequently, analyses presented in this EIS that required scaling from existing flight operations are based on 36 aircraft in the existing F/A-18C/D FRS squadron.

Table E-34 summarizes existing annual flight operations and associated emission rates for F/A-18C/D squadrons currently based at NAS Lemoore. Aircraft fuel use rates and emission factors as a function of fuel flow are based on data from the Navy's Aircraft Environmental Support Office (US Navy 1990, 1998). Time-in-mode estimates for different categories of flight events were provided by the E/F Fleet Introduction Team (FIT) at NAS Lemoore. Table E-35 presents the resulting estimate of annual emissions from existing F/A-18C/D flight operations at NAS Lemoore. The emissions shown in Table E-35 would continue throughout Phase 1 of the proposed action under the NAS Lemoore Alternative.

Phase 1 and Phase 2 Aircraft Emissions. Table E-36 summarizes data used for the analysis of F/A-18 flight activity emissions. Flight activity estimates are presented by various squadron groupings: the F/A-18E/F FRS squadron, the four Phase 1 fleet squadrons, the six Phase 2 fleet squadrons, the six existing F/A-18C/D squadrons that would be replaced during Phase 2 under the NAS Lemoore Alternative, and the 26 F/A-18C/D aircraft that would be removed from the existing F/A-18C/D FRS squadron during Phase 2 under the NAS Lemoore Alternative.

The flight operation numbers listed in Table E-36 are those conducted at the home base for the F/A-18E/F aircraft. Flight operations conducted outside the relevant air basin are not included.

Aircraft fuel use rates and emission factors as a function of fuel flow are based on data from the Navy's Aircraft Environmental Support Office (US Navy 1990, 1997b, 1998). Time-in-mode estimates for different categories of flight events were provided by the E/F FIT at NAS Lemoore.

Table E-37 presents the estimated annual emissions from Phase 1 and Phase 2 F/A-18 aircraft flight operations. Emission analyses presented in Table E-37 are organized by squadron groupings as was done for Table E-33. Table E-37 shows estimated emissions in two formats: as typical summer/winter day emissions (pounds per day), and as annual emissions (tons per year). Many air quality management plans present emission inventories and forecasts in a summer/winter day or average day format. Clean Air Act conformity rules include emission threshold specified in a tons per year format. Both data formats are presented in Table E-37.

Emissions from aircraft flight operations associated with the proposed action would peak at the end of Phase 1 under the NAS Lemoore Alternative and at the end of Phase 2 under the NAF El Centro Alternative. Under the NAS Lemoore Alternative, total emissions from aircraft flight operations in 2003 and 2004 would be the sum of Phase 1 F/A-18E/F emissions (Table E-37) and existing baseline F/A-18C/D emissions (Table E-35): 705.01 tons per year of reactive organic compounds, 467.61 tons per year of nitrogen oxides, and 323.10 tons per year of PM_{10}.

Emissions From Existing F/A-18C/D Aircraft Remaining at the End of Phase 2. If NAS Lemoore is selected as the F/A-18E/F introduction site, Phase 2 of the proposed action will leave four F/A-18C/D fleet squadrons (48 aircraft) and a reduced F/A-18C/D FRS squadron (10 aircraft) continuing to operate from NAS Lemoore. Table E-38 presents flight operation and emission rate data for the F/A-18C/D aircraft that would remain at NAS Lemoore after Phase 2 of the proposed action. Table E-39 summarizes annual emissions from these F/A-18C/D aircraft.

Emissions from total NAS Lemoore aircraft operations at the end of Phase 2 (2010) are the sum of emissions presented in Table E-39 (remaining F/A-18C/D aircraft) plus emissions from three of the subsections in Table E-37 (Phase 1 F/A-18E/F FRS aircraft, Phase 1 F/A-18E/F fleet squadron aircraft, Phase 2 F/A-18E/F fleet squadron aircraft): 576.94 tons per year of reactive organic compounds, 430.39 tons per year of nitrogen oxide emissions, and 255.13 tons per year of PM_{10} emissions.

E.2.3 In-frame Engine Run-up Emissions

In addition to direct flight operations, there will be emissions associated with engine tests performed after engine maintenance. In-frame engine run-ups are performed when maintenance activities do not require removing the engine from the aircraft. Depending on the nature of in-frame engine maintenance, run-ups will be performed in either a low power or high power mode. The high power in-frame test lasts longer and includes engine operation at full IRP power and afterburner modes. Low power engine run-ups are often performed on just one engine. To maintain aircraft balance, high power engine run-ups typically involve testing of both engines at the same time. However, only one engine at a time is operated at IRP or afterburner settings during high power run-up tests. While one engine is tested at IRP or afterburner power, the other engine is tested at an 85 percent rpm setting.

Table E-40 summarizes emission estimates for in-frame engine run-ups by the 160 existing F/A-18C/D aircraft currently based at NAS Lemoore. The emissions shown in Table E-40 would continue throughout Phase 1 of the proposed action under the NAS Lemoore Alternative.

Emission estimates for in-frame engine run-ups associated with Phase 1 and Phase 2 components of the proposed action are presented in Table E-41. Table E-36 shows emission estimates separately for the various aircraft squadron components associated with Phase 1 and Phase 2 of the F/A-18E/F introduction. In-frame run-ups associated with replaced or eliminated F/A-18C/D aircraft under the NAS Lemoore Alternative also are included in Table E-41.

Table E-42 provides a summary of in-frame engine run-up emission changes for Phase 1 and Phase 2 at each of the alternative receiving installations. Emissions from in-frame engine run-ups associated with the proposed action would peak at

the end of Phase 1 under the NAS Lemoore Alternative and at the end of Phase 2 under the NAF El Centro Alternative. Under the NAS Lemoore Alternative, total emissions from aircraft in-frame engine run-ups in 2003 and 2004 would be the sum of Phase 1 F/A-18E/F emissions (Table E-42) and existing baseline F/A-18C/D emissions (Table E-40): 35.40 tons per year of reactive organic compounds, 26.34 tons per year of nitrogen oxides, and 18.86 tons per year of PM_{10}.

Table E-43 summarizes emission estimates for in-frame engine run-ups associated with the 58 existing F/A-18C/D aircraft that will remain at NAS Lemoore after completion of Phase 2 of the proposed action under the NAS Lemoore Alternative. Under the NAS Lemoore Alternative, total in-frame engine run-up emissions at the end of Phase 2 would be the sum emissions shown in Table E-43 plus the NAS Lemoore Phase 2 emissions in Table E-42: 18.81 tons per year of reactive organic compounds, 20.62 tons per year of nitrogen oxides, and 9.44 tons per year of PM_{10}.

E.2.4 Engine Test Cell Operations

When engines are removed from the aircraft for extensive maintenance, engine run-ups are performed in specialized engine test cells or outdoor test stands. NAS Lemoore is the current home base for most Navy F/A-18 aircraft on the West coast. Data for engine test cell operations at NAS Lemoore (Shubert 1997) were used to estimate test cell operating patterns for the new engines on the F/A-18E/F aircraft.

Table E-44 summarizes the types of test cycles currently conducted on F/A-18C/D aircraft engines at NAS Lemoore. More than half of the test events are relatively brief routine tests (schedule checks) that last about 14 minutes. Slightly less than half of all test events are much longer "break-in" tests. Existing F/A-18C/D aircraft use one of two slightly different engine models. Each engine model has a different test protocol for break-in testing.

Test cell protocols specific to the new engine used in F/A-18E/F aircraft were not available when this EIS was prepared. Consequently, test cycles used for the F/A-18C/D engines were used to estimate reasonable schedule check and break-in test cycles for the F/A-18E/F engine. Table E-45 presents the engine test cell cycles assumed for the analyses presented in this EIS.

Fuel use and emission factors for power settings used in engine test cells were obtained for the Navy's Aircraft Environmental Support Office (U.S. Navy 1990, 1997a, 1997b, 1998). The number of test cell engine run-ups per aircraft was estimated from test cell fuel use information (Castro 1997b), weighted average fuel consumption estimates for F/A-18C/D engine tests, and JP-5 fuel density. Available data indicate an average of 4.94 test cell run-ups per year per aircraft.

Table E-46 presents estimated annual test cell emissions for the existing 160 F/A-18C/D aircraft currently stationed at NAS Lemoore. The emissions shown in Table E-46 would continue throughout Phase 1 of the proposed action under the NAS Lemoore Alternative.

Tables E-47 through E-49 present estimated engine test cell emissions for F/A-18E/F aircraft associated with Phase 1 and Phase 2 of the proposed action. Tables E-50 and E-51 show the estimated test cell emissions associated with F/A-18C/D aircraft that would be replaced or eliminated during Phase 2 of the proposed action under the NAS Lemoore Alternative. Table E-52 summarizes the annual engine test cell emissions associated with Phase 1 of the proposed action at either NAS Lemoore or NAF El Centro. Table E-53 summarizes the net change in annual engine test cell emissions at the end of Phase 2 for the NAS Lemoore Alternative. Table E-54 summarizes the annual engine test cell emissions at the end of Phase 2 for the NAF El Centro Alternative.

Emissions from engine test cell use associated with the proposed action would peak at the end of Phase 1 under the NAS Lemoore Alternative and at the end of Phase 2 under the NAF El Centro Alternative. Under the NAS Lemoore Alternative, total emissions from engine test cell use in 2003 and 2004 would be the sum of Phase 1 F/A-18E/F emissions (Table E-52) and existing baseline F/A-18C/D emissions (Table E-46): 8.83 tons per year of reactive organic compounds, 51.50 tons per year of nitrogen oxides, and 7.60 tons per year of PM_{10}.

Table E-55 summarizes engine test cell emissions for the 58 F/A-18C/D aircraft that would remain at NAS Lemoore after Phase 2 of the proposed action under the NAS Lemoore Alternative. Under the NAS Lemoore Alternative, total annual engine test cell emissions at the end of Phase 2 would be the sum of emissions indicated in Tables E-53 and E-55: 6.04 tons per year of reactive organic compounds, 39.88 tons per year of nitrogen oxides, and 3.69 tons per year of PM_{10}.

Engine test cells require permits from local air pollution control districts, and thus are considered a stationary source excluded from general conformity analyses.

E.2.5 Aircraft Support Equipment

Aircraft operations generally require the use of some specialized ground support equipment. The most common equipment for F/A-18 aircraft includes tow tractors, bomb hoists, and hydraulic test stands. A variety of other equipment (portable generators, air conditioning units, engine air start units, floodlight sets, deicing equipment, etc.) is used for standby and emergency purposes. Table E-56 identifies equipment that will be used to support and maintain the F/A-18E/F aircraft. Also shown in Table E-56 are the similar items already in place at NAS Lemoore to support the existing F/A-18C/D squadrons. Table E-56 indicates

additional equipment required for both the Phase 1 and Phase 2 portions of the proposed action.

The Phase 1 equipment additions would apply to both the NAS Lemoore and NAF El Centro alternatives. The Phase 2 equipment additions would apply only to the NAF El Centro Alternative, since aircraft additions under Phase 2 at NAS Lemoore would be replacements for six existing FA-18C/D fleet squadrons. No unique engine-powered equipment items are required to support the F/A-18E/F aircraft. Under the NAS Lemoore Alternative, existing F/A-18C/D fleet squadron equipment would be retained to support the Phase 2 replacement aircraft.

Projected equipment additions shown in Table E-56 are based on a generalized requirement of two items of each type of "rolling stock" per aircraft squadron. This generalized requirement has been modified as necessary in cases where the existing equipment inventory at NAS Lemoore indicates a higher equipment use factor. Thus, the equipment additions identified in Table E-56 provide a conservatively high estimate of support equipment requirements.

Hydraulic test stand requirements are split between two similar models. Tow tractors have been categorized into four general size categories. Although many different models of tow tractors are available, one model from each size category has been used for emissions analysis purposes. The overall requirement for additional tow tractors has been split among size categories based on the existing mix of tow tractor types at NAS Lemoore. In the case of air start units and air conditioning units, equipment is shared between fleet squadrons and the FRS squadron.

As indicated in Table E-56, tow tractors, bomb hoists, and hydraulic test stands are used routinely. Towable generators, air start units, air conditioning units, and floodlight sets are used for standby purposes only, since the airfields at both NAS Lemoore and NAF El Centro either have or will install fixed point utility systems to provide electrical power and air conditioning to aircraft. Lift bag blowers, heaters, and deicing equipment are basic airfield support equipment used only in unusual situations. The proposed action will not create additional requirements for such basic airfield support equipment.

The equipment items listed in Table E-56 are classified either as mobile sources or as portable equipment. State law allows the owners of portable equipment to either register the equipment with the state or to operate the equipment under stationary source permits from the appropriate air pollution control district. Stationary sources operated under air pollution control district permits are exempt from the general conformity rule. Items registered with the state as portable equipment are not subject to stationary source permit requirements, and must be accounted for in Clean Air Act conformity analyses. All items listed in Table E-56 are considered mobile sources, registered portable equipment items, or

other permit-exempt emission sources that must be accounted for in the conformity determination analyses.

Equipment associated with fixed point utility systems (such as compressors) are stationary source items subject to air pollution control district permit requirements. Consequently, those items are excluded from Clean Air Act conformity analyses.

Table E-57 summarizes annual emissions from added support equipment items. Fuel use or operating time data are not available for tow tractors at NAS Lemoore. Consequently, use rates for tow tractors are a generalized estimate that accounts for moving aircraft and equipment to support both flight operations and aircraft maintenance activity. The use estimate (8 hours of operation per week per tow tractor) is equivalent to slightly more than 1.25 hours of operation per aircraft sortie. Use estimates for hydraulic test stands are derived from data provided by NAS Lemoore (Castro 1997a). The use estimate for bomb hoists is equivalent to 1 hour of use for every 7.9 aircraft sorties. Use estimates for air start units and air conditioning units are based on data provided by NAS Lemoore (Castro 1997a).

Existing truck-mounted generators at NAS Lemoore are being replaced by the trailer-mounted towable units listed in Tables E-56 and E-57. Because vehicle-mounted generators were not subject to permit requirements, no records are available on historical use patterns. The use estimates for generators and standby equipment items represents 1,760 horsepower-hours per month of equipment use.

Emission rates used in Table E-57 are based on U.S. Environmental Protection Agency (1991, 1995) data. EPA has not published emission factors for equipment fueled by JP-5. Emission rates for diesel engine equipment items that are using JP-5 jet fuel at NAS Lemoore incorporate adjustment factors provided by equipment manufacturers (Castro 1997a). Emission calculations incorporate load factor adjustments to engine horsepower ratings. Bomb hoists, air start units, and air conditioning units are assumed to operate at 100 percent load. Tow tractors and generators are assumed to operate at 40 percent load. Tow tractors used by the Navy generally have larger engines than the average size cited by EPA (US Environmental Protection Agency 1991), and are used to move aircraft that are much smaller than commercial airliners. Thus, a relatively low load factor is appropriate. Hydraulic test stands are assumed to operate at 85 percent load to match manufacturer estimates of operating horsepower (Castro 1997a).

As noted previously, aircraft support equipment emission estimates for Phase 1 apply to both the NAS Lemoore and NAF El Centro alternatives. Aircraft support equipment emissions under the NAS Lemoore Alternative will not change during Phase 2. Support equipment emissions will increase during Phase 2 for the NAF El Centro Alternative. The Phase 2 data in Table E-57 shows both the incremental increase above Phase 1 emission levels and the overall total Phase

2 emissions from aircraft support equipment under the NAF El Centro Alternative.

E.2.6 Aircraft Refueling

F/A-18 aircraft use JP-5 (jet kerosene) aircraft fuel. JP-5 jet fuel has a low volatility. Emissions from jet fuel storage and handling facilities are typically below the thresholds that would require stationary source air permits. Jet fuel storage and handling facilities at NAS Lemoore and NAF El Centro are exempt from air pollution control district permits. Consequently, the small quantities of emissions generated by fuel transfer operations are subject to consideration under the EPA general conformity rule.

The F/A-18E/F FIT team provided annual fuel use estimates for FRS and fleet squadrons. The FRS squadron will use about 11 million gallons of fuel per year. Each Phase 1 fleet squadron (14 aircraft) would use about 2.2 million gallons of fuel per year. By extrapolation, each Phase 2 fleet squadron (12 aircraft) would use about 1.9 million gallons of fuel per year.

Fuel handling and transfers will result in small quantities of evaporative emissions as liquid fuel displaces air and fuel vapors when fuel tanks are filled (U.S. Environmental Protection Agency 1995). As indicated in Table E-58 fuel transfer emissions vary with temperature. The emission rates indicated in Table E-58 assume splash loading of fuel tanks. The maximum emissions would occur if aircraft are refueled from fuel trucks rather than from fixed refueling systems. When fuel trucks are used, two fuel transfers are required: filling the tank truck, and fueling the aircraft.

The two alternative receiving installations for the F/A-18E/F aircraft experience different seasonal temperature patterns (WeatherDisc Associates 1990). Monthly temperature patterns for NAS Lemoore and NAF El Centro are presented in Table E-73.

Refueling emission estimates for the NAS Lemoore Alternative (Tables E-59 through E-62) assume one month with an average temperature of 40 degrees Fahrenheit, four months with an average temperature of 50 degrees Fahrenheit, one month with an average temperature of 60 degrees Fahrenheit, four months with an average temperature of 70 degrees Fahrenheit, and two months with an average temperature of 80 degrees Fahrenheit.

Aircraft refueling emission estimates for Phase 2 under the NAS Lemoore Alternative (Table E-62) assume no change in aircraft fuel use from the end of Phase 1. In reality, overall aircraft fuel use at NAS Lemoore is likely to decline slightly during Phase 2, since 26 existing F/A-18C/D FRS squadron aircraft will be eliminated. Given the high flight operations pattern of FRS squadron aircraft (see Tables E-31 and E-32), the F/A-18C/D FRS squadron reduction will more

than compensate for any differential in annual fuel use by F/A-18C/D fleet squadron aircraft that are replaced with F/A-18E/F aircraft.

Refueling emission estimates for the NAF El Centro Alternative (Tables E-63 through E-72) assume five months with an average temperature of 60 degrees Fahrenheit, one month with an average temperature of 70 degrees Fahrenheit, two months with an average temperature of 80 degrees Fahrenheit, and four months with an average temperature of 90 degrees Fahrenheit.

E.2.7 Paint, Solvent, and Abrasive Use for Aircraft Maintenance

Paints, solvents, and abrasive blasting media used for aircraft and engine maintenance activities will be additional minor sources of emissions associated with F/A-18E/F aircraft. Information available from NAS Lemoore provided generalized paint, solvent, and abrasive blast media use rates on a per-aircraft basis (Castro 1997b). Emission rate estimates (Table E-58) are based on typical solvent content for paints, 100 percent volatility for solvents, and 1 percent emissions for abrasive blast media.

Paint, solvent, and abrasive blast media emission estimates are presented in Tables E-59 through E-62 for the NAS Lemoore Alternative, and Tables E-63 through E-72 for the NAF El Centro Alternative. Emission estimates for Phase 2 under the NAS Lemoore Alternative (Table E-62) assume no change from conditions at the end of Phase 1. In reality, overall paint, solvent, and abrasive blast media use at NAS Lemoore is likely to decline slightly during Phase 2, since 26 existing F/A-18C/D FRS squadron aircraft will be eliminated.

Aircraft and engine maintenance activities will occur in facilities subject to air pollution control district permit requirements. Thus, these emissions are considered stationary source emissions excluded from conformity analyses.

E.2.8 Natural Gas Use for Space and Water Heating

Space heating and water heating requirements for buildings will be met using natural gas as a heating fuel. Data from NAS Lemoore (Castro 1997a) indicate consistent sizes for boiler facilities used in hangars and BEQ/BOQ housing (Table E-58). Boilers in these size ranges require permits from air pollution control districts, and thus are stationary sources excluded from conformity analyses. Natural gas use for family housing, personnel support facilities, and general administrative space has been estimated using generic energy use assumptions derived from data in Hunn (1996).

Emission estimates for natural gas use are presented in Tables E-59 through E-62 for the NAS Lemoore Alternative, and Tables E-63 through E-72 for the NAF El Centro Alternative.

E.2.9 Personal Vehicle Use

Air pollutant emissions associated with personal vehicle travel were estimated by combining appropriate vehicle emission rates and travel pattern estimates. Travel pattern estimates were developed to reflect typical travel patterns for trips from on-base housing versus trips from off-base housing. Vehicle emission rates were calculated using the EMFAC7F vehicle emission rate model (California Air Resources Board 1992, 1993).

The EMFAC Vehicle Emissions Model. EMFAC7F determines vehicle emission rates based on a wide range of factors: pollutants of interest; calendar year; air temperature; mix of vehicle types; vehicle operating mode conditions; average route speed; age distribution of vehicles by type; average annual mileage accumulations by vehicle age and type; basic exhaust emission rates for new vehicles by vehicle type and model year; deterioration rates for exhaust emissions by vehicle type and accumulated mileage; and the effectiveness of vehicle inspection and maintenance programs.

EMFAC7F is designed primarily for use in generating regional and statewide emission inventories rather than for performing project-specific analyses. The model is structured to use state-wide average default values for most input parameters. To provide flexibility for project-specific analyses, standardized EMFAC7F output files provided by the California Air Resources Board (CARB) were placed into a spreadsheet model that performs appropriate unit conversions and composite weightings while allowing the user to vary key parameters of interest. Lookup table data in the spreadsheet version of EMFAC7F are based on 5 mph speed increments and 10 degree temperature increments.

The EMFAC7F program recognizes three operating mode conditions for gasoline-fueled passenger vehicles. These operating modes (cold start, hot start, and hot stabilized) are a function of four factors: how long a vehicle's engine has been on; how long the vehicle was parked before the engine was started; the operating mode condition of the vehicle at the time it was previously parked; and whether the vehicle has a catalytic converter. Vehicles operating in a cold start mode have significantly higher emission rates than those operating in hot start or hot stabilized modes.

Vehicle Operating Modes. Vehicle operating mode definitions reflect the conditions of standardized test procedures used to certify that new vehicles meet applicable federal and state emission standards. By definition, the hot stabilized mode represents all vehicle operations occurring after the engine has been on for 505 seconds. The first 505 seconds of vehicle operation will be in either a cold start or a hot start mode. Cold start and hot start operating modes are distinguished by three factors: the operating mode condition of the vehicle when parked; the duration of parking preceding vehicle start-up; and the presence or absence of a catalytic converter.

Vehicles with a catalytic converter will resume operations in a cold start mode after the engine has been off for 1 hour or more. Vehicles without a catalytic converter resume operations in a cold start mode after the engine has been off for 4 hours or more. Any vehicle which is still in a cold start mode when parked will resume operations in a cold start mode regardless of the parking duration.

If a catalyst-equipped vehicle is parked for less than 1 hour, it will resume operations in a hot start mode (unless the vehicle was still in a cold start mode when it parked). If a noncatalyst vehicle is parked for a period of less than 4 hours, it will resume operations in a hot start mode.

Parking duration patterns vary by trip purpose. Work trips often begin in a cold start mode and end with a long parking duration. Shopping trips are more likely to begin in a hot start mode and end with a short or intermediate parking duration. Typical cold start and hot start patterns by trip type have been developed by the California Department of Transportation (Caltrans) using data from statewide travel pattern surveys (California Department of Transportation 1981).

Average vehicle operating mode conditions can be calculated directly from a known or assumed travel time distribution. Travel time distribution assumptions are most easily established by separating overall vehicle travel into trip purpose categories that can be associated with residential and nonresidential land use categories. Three trip categories (home-work trips, home-shopping trips, home-other trips) are normally used for residential land uses. Two additional trip categories (other-work and other-other) are typically added for nonresidential land uses.

Travel Patterns. The analyses used for this EIS were developed separately for on-base and off-base housing. Travel patterns associated with off-base housing were evaluated in greater detail than those associated with on-base housing.

A single generic travel time distribution pattern was use for on-base housing at each alternative (Table E-74). Vehicle emission rates for trips from on-base housing were prepared separately for each alternative, since summer temperature patterns differ significantly among the alternative receiving installation. Differences in diurnal temperature patterns affect both exhaust and evaporative emissions from motor vehicles. EMFAC7F input data and resulting emission rates for trips from on-base housing are presented in Tables E-75 and E-76 for the NAS Lemoore Alternative, and in Tables E-77 and E-78 for the NAF El Centro Alternative.

Separate travel time distribution patterns were developed for trips associated with off-base housing for each alternative. The travel time patterns were developed by examining land use and highway maps to identify the spatial distribution of residential communities around each base and the roadway systems providing

access to the base from these residential communities. The mean work trip travel times produced by this analysis are slightly shorter than the average commute times presented in published summaries of travel survey data (U.S. Federal Highway Administration 1985; California Department of Transportation 1992). Housing availability and prices will always be an important consideration affecting the housing locations selected by personnel living off-base. In addition, military employees are likely to give somewhat greater consideration to proximity to the base (as both an employment site and as a location for various services and facilities) than will civilian employees. Consequently, off-base personnel are likely to have slightly shorter commute times than the regional average.

Table E-79 presents the travel time patterns used for off-base housing under the NAS Lemoore Alternative. The mean commute trip travel time (16.1 minutes) is slightly shorter than the average values for the Fresno region: 18 minutes in 1980 (US Federal Highway Administration 1985) and 17 minutes in 1991 (California Department of Transportation (1992).

EMFAC7F input data and resulting emission rates for trips associated with off-base housing under the NAS Lemoore Alternative are presented in Tables E-80 and E-81. The entrained roadway dust emission rate presented in Table E-81 is a weighted average of PM_{10} rates estimated by equations in US Environmental Protection Agency (1985a) for local streets, collector streets, major arterial highways, and freeways or expressways.

Table E-82 presents travel time patterns used for off-base housing under the NAF El Centro Alternative. Although the commute trip travel time patterns differ from those estimated for the NAS Lemoore Alternative, the patterns estimated for the NAF El Centro Alternative yield a nearly identical average commute trip time (16.08 minutes).

EMFAC7F input data and resulting emission rates for trips associated with off-base housing under the NAF El Centro Alternative are presented in Tables E-83 and E-84. The entrained roadway dust emission rate presented in Table E-84 is a weighted average of PM_{10} rates estimated by equations in US Environmental Protection Agency (1985a) for local streets, collector streets, major arterial highways, and freeways or expressways.

Emission Estimates. Travel time distributions and associated vehicle emission factors were converted into overall emission estimates by establishing vehicle trip generation rates and vehicle speed distribution patterns by trip purpose and on-base versus off-base housing situation. Different speed distributions were used at each alternative receiving installation for work trips from on-base housing, thus converting the generic travel time pattern into different average trip distance values.

The EMFAC7F model does not estimate sulfur oxide emissions from motor vehicles or resuspended roadway dust from vehicle traffic. Sulfur oxide emissions have been estimated using a generalized emission factor of 0.03 grams per vehicle-mile (Bay Area Air Quality Management District 1996). Resuspended roadway dust has been incorporated into the analysis using emission rate equations from US Environmental Protection Agency (1985a).

Table E-85 summarizes the trip generation rates used for the NAS Lemoore Alternative. Conventional trip generation rates have been used for the analysis. To simplify adjustments for squadron deployments away from NAS Lemoore, on-base family housing and off-base housing categories have been separated into the military commute trip component and other household travel. Table E-86 summarizes the partitioning of trip generation rates into trip purpose categories, and shows the adjustments made to account for one out of the four fleet squadrons being deployed at any given time. Table E-86 also identifies the average trip durations and speed distributions assumed for the different trip purpose categories. Table E-87 provides a summary of weekday trip generation, vehicle miles traveled, and vehicle emissions for Phase 1 of the NAS Lemoore Alternative. Vehicle emissions have been separated into two components: emissions associated with base-related commute trips, and emissions associated with other household travel (shopping and other travel, including work trips by dependents). Base-related commute trip emissions are included in conformity analyses. There would be no additional personnel or vehicle travel associated with Phase 2 conditions for the NAS Lemoore Alternative because existing squadrons would merely be changing the aircraft they fly.

Table E-88 summarizes the trip generation rates used for Phase 1 of the NAF El Centro Alternative. As was the case with the NAS Lemoore Alternative, trips associated with on-base family housing and off-base housing have been separated into the military commute trip component and other household travel. Table E-89 summarizes the partitioning of Phase 1 trip generation rates into trip purpose categories, and shows the adjustments made to account for one out of the four fleet squadrons being deployed at any given time. Table E-89 also identifies the average trip durations and speed distributions assumed for the different trip purpose categories. Table E-90 provides a summary of weekday trip generation, vehicle miles traveled, and vehicle emissions for Phase 1 of the NAF El Centro Alternative.

Phase 2 of the NAF El Centro Alternative would add six additional fleet squadrons of aircraft and associated personnel at NAF El Centro. Table E-91 summarizes the trip generation rates used for Phase 2 of the NAF El Centro Alternative. Table E-92 summarizes the partitioning of Phase 2 trip generation rates into trip purpose categories. Table E-92 also identifies the average trip durations and speed distributions assumed for the different trip purpose categories. Table E-93 provides a summary of weekday trip generation, vehicle

miles traveled, and vehicle emissions for Phase 2 of the NAF El Centro Alternative.

E.2.10 Government Vehicles

Government vehicle fleets at military bases are typically dominated by pick-up trucks, sport utility vehicles, and vans. Heavy duty trucks, sedans, and some buses constitute the remainder of the government-owned vehicle fleet. Personnel and equipment transportation generates a mixture of on-base and off-base travel.

NAS Lemoore is currently implementing programs to reduce the size of the existing government vehicle fleet (Shubert 1998). Consequently, the aircraft squadrons added by the proposed action will be assigned only a limited number of vehicles. The FRS squadron will have four vehicles: one 8-passenger van, two pick-up trucks, and one flatbed truck. Fleet squadrons will be provided with one pick-up truck each. Based on existing vehicle use patterns for the F/A-18C/D squadrons at NAS Lemoore, FRS squadron vehicles will accumulate approximately 39,490 miles per year and each fleet squadron vehicle will accumulate approximately 24,000 miles per year.

Emissions associated with use of the added government vehicles have been analyzed in a manner generally similar to that used for the evaluation of personal vehicle travel. Table E-94 summarizes generalized vehicle travel patterns used for evaluating on-base and off-base vehicle use for both the NAS Lemoore and NAF El Centro alternatives.

Tables E-95 and E-96 present input data and resulting emission rates for government-owned vehicles at temperature patterns experienced in the NAS Lemoore area. Tables E-97 and E-98 present input data and resulting emission rates for government-owned vehicles at temperature patterns experienced in the NAF El Centro area. Table E-99 presents a more concise summary of composite emission rates for government vehicle fleets at NAS Lemoore and NAF El Centro. The differences in emission factors between these locations are due primarily to differences in seasonal temperature patterns.

Table E-100 summarizes the conversion of travel time patterns into vehicle miles traveled (VMT) distribution patterns for on-base and off-base trips, based on an estimated distribution of travel time among five average speed categories. Table E-101 summarizes the estimated annual VMT and resulting emissions for government vehicle use associated with the proposed action.

E.3 CLEAN AIR ACT CONFORMITY REQUIREMENTS

E.3.1 Introduction

Section 176(c) of the Clean Air Act requires that federal agency actions be consistent with the Clean Air Act and with any approved air quality management plan (state implementation plan [SIP]). EPA adopted Clean Air Act conformity

requirements in two stages: one rule for regional transportation plans, highway projects, and transit projects; and a second rule for other federal agency actions.

The conformity rule for highway and mass transit plans and projects was promulgated in the November 24, 1993 Federal Register (58 FR 62188-62216). The transportation conformity rule (40 CFR Part 93 Subpart A) applies to transportation plans and transportation projects that require action by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) under Title 23 U.S.C. or the Federal Transit Act. The transportation conformity rule defines a "transportation project" as a highway project or mass transit project. Federal agency actions affecting airports, harbors, or freight rail facilities would normally be subject to the general conformity rule, not the transportation conformity rule.

The conformity rule for general federal actions was promulgated in the November 30, 1993 Federal Register (58 FR 63214-63259), and became effective on January 31, 1994. The Navy's proposed realignment action is subject to the general conformity rule (40 CFR Part 93 Subpart B; duplicated in 40 CFR Part 51 Subpart W). Most air pollution control districts have adopted the EPA conformity rules verbatim, often by direct reference to the relevant 40 CFR parts. For example, San Joaquin Valley Unified Air Pollution Control District Rule 9110 adopts the EPA general conformity rule by reference to 40 CFR Part 51 Subpart W.

E.3.2 Purpose of the General Conformity Rule

The EPA general conformity rule requires federal agencies to analyze proposed actions according to standardized procedures and to provide a public review and comment process. The conformity determination process is intended to demonstrate that the proposed federal action:

- Will not cause or contribute to new violations of federal air quality standards;
- Will not increase the frequency or severity of existing violations of federal air quality standards; and
- Will not delay the timely attainment of federal air quality standards.

E.3.3 Applicability of the General Conformity Rule

The EPA general conformity rule applies to general federal actions affecting nonattainment areas and to designated maintenance areas (attainment areas that were previously designated as nonattainment areas). As noted previously, highway or mass transit projects that require FHWA or FTA funding or approval will be subject to transportation conformity rule requirements rather than the EPA general conformity rule requirements. Analyses required by the general conformity rule must be performed for each nonattainment or maintenance pollutant and its relevant precursors.

Five categories of actions and projects are excluded from the general conformity rule requirements (40 CFR 93.153(d)):

- Stationary sources requiring new source review (NSR) or prevention of significant deterioration (PSD) permits;
- Direct emissions from remedial actions at Superfund (CERCLA) sites when the substantive requirements of NSR/PSD programs are met or when the action is otherwise exempted under provisions of CERCLA;
- Initial and continuing actions in response to emergencies or disasters;
- Alterations and additions to existing structures as specifically required by applicable environmental legislation or regulations; and
- Various special studies and research investigation actions.

Conformity determinations are not required to address the emissions consequences of those portions of an action that are not reasonably foreseeable or are not quantifiable.

In addition, conformity determinations are not required when the annual direct and indirect emissions from the action will be less than the applicable *de minimis* thresholds (40 CFR 93.153(c); 40 CFR 51.853(c)). Applicable de mimimis levels vary by pollutant and the severity of nonattainment conditions (40 CFR 93.153(b); 40 CFR 51.853(b)). The *de minimis* thresholds in carbon monoxide, sulfur dioxide, or nitrogen dioxide nonattainment areas are 100 tons per year of the relevant pollutant. The *de minimis* threshold in lead nonattainment areas is 25 tons per year.

The *de minimis* threshold in ozone nonattainment areas generally applies to both organic compound and nitrogen oxide emissions. The *de minimis* level varies according to severity of nonattainment: 100 tons per year in marginal or moderate nonattainment areas, 50 tons per year in serious nonattainment areas, 25 tons per year in severe nonattainment areas, and 10 tons per year in extreme nonattainment areas.

The *de minimis* threshold in PM_{10} nonattainment areas applies to identified PM_{10} precursors as well as to directly emitted PM_{10}. The *de minimis* level is 100 tons per year in moderate nonattainment areas and 70 tons per year in severe nonattainment areas.

The EPA conformity rule identifies several categories of actions that are presumed to result in no net emissions increase or in an emissions increase that will clearly be less than any applicable *de minimis* level. These types of activities are primarily routine administrative, planning, financial, property disposal, or property maintenance actions.

Regardless of the applicable *de minimis* level, conformity assessments are required for non-exempt "regionally significant" actions: direct and indirect emissions exceed 10 percent of the applicable SIP emissions inventory, regardless of numerical value.

Emission estimates summarized in Chapter 4 of the EIS and documented in subsequent sections of this appendix demonstrate that Clean Air Act conformity determination requirements apply to both the NAS Lemoore and NAF El Centro alternatives.

E.3.4 Responsibility for Conformity Determinations

The federal agency undertaking the action is responsible for preparing and issuing the conformity determination under the EPA conformity rules. Other federal, state, and local agencies have review and comment responsibility.

E.3.5 Options for Demonstrating Conformity

Two types of technical analyses can be used to demonstrate Clean Air Act conformity:

- Dispersion modeling demonstrations for primary (i.e., directly emitted) pollutants to show that there will be no violations of federal ambient air quality standards; or
- Emissions analyses that demonstrate that there will be no net emissions increase and that emissions will not interfere with the timely attainment and maintenance of federal ambient air quality standards.

Dispersion modeling demonstrations of conformity are not allowed for ozone nonattainment areas, and will seldom be feasible for other secondary pollutants (nitrogen dioxide and particulate matter). In addition, modeling may not be possible for some types of emission sources due to the lack of appropriate dispersion models. In general, dispersion modeling is most useful for carbon monoxide, lead, and sulfur dioxide nonattainment areas. Dispersion modeling may be useful in some PM_{10} nonattainment areas if secondary PM_{10} is not a significant contributor to nonattainment conditions.

If dispersion modeling is not used for the conformity demonstration, then the conformity demonstration requires either consistency with emission forecasts in SIP documents or identification of concurrent or prior emission reductions that will compensate for emission increases associated with a proposed action.

If EPA has not yet approved a SIP document submitted pursuant to the Clean Air Act Amendments of 1990, there are two basic options for demonstrating conformity.

- Conformity will be demonstrated if direct and indirect emissions from the action are fully offset through compensating emission reductions implemented through a federally enforceable mechanism (40 CFR 93.158(a)(2); 40 CFR 51.858(a)(2)).
- Alternatively, conformity can be demonstrated by showing that total direct and indirect emissions with the federal action do not exceed estimated future baseline scenario emissions. Future baseline scenario emissions are total direct and indirect emissions that would occur in future years if baseline (1990 or the nonattainment designation year) emission source activity levels remain constant in the geographic area affected by the federal action. The future baseline scenario represents a "no action" scenario projected to the maximum emissions year for the proposed action, to the attainment year mandated by the Clean Air Act, and to any other "milestone" years identified in the existing SIP (40 CFR 93.158(a)(5)(iv)(A); 40 CFR 51.858(a)(5)(iv)(A)).

If EPA has approved SIP revisions pursuant to the 1990 Clean Air Act Amendments, any one of several options can be used for demonstrating conformity.

- Conformity is presumed if direct and indirect emissions from the activity are specifically identified and accounted for in the attainment or maintenance demonstration of a SIP approved after 1990 (40 CFR 93.158(a)(1); 40 CFR 51.858(a)(1)).
- Conformity will be demonstrated if direct and indirect emissions from the action are fully offset through compensating emission reductions implemented through a federally enforceable mechanism (40 CFR 93.158(a)(2) and 40 CFR 93.158(a)(5)(iii); 40 CFR 51.858(a)(2) and 40 CFR 51.858(a)(5)(iii)).
- Conformity also can be demonstrated if the agency responsible for SIP preparation provides documentation that direct and indirect emissions associated with the federal agency action are accommodated within the emission forecasts contained in an approved SIP (40 CFR 93.158(a)(5)(i)(A); 40 CFR 51.858(a)(5)(i)(A)).
- Finally, if SIP conformity cannot be demonstrated by the procedures noted above, a conformity determination is possible only if the relevant air quality management agency notifies EPA that appropriate changes will be made in the applicable SIP documents. The air quality management agency must commit to a schedule for preparing an acceptable SIP amendment that accommodates the net increase in direct and indirect emissions from the federal action without causing any delay in the schedule for attaining the relevant federal ambient air quality standard (40 CFR 93.158(a)(5)(i)(B); 40 CFR 51.858(a)(5)(i)(B)).

All conformity determinations must also demonstrate that total direct and indirect emissions are consistent with all relevant requirements and milestones in the applicable SIP including:

- Reasonable further progress schedules,
- Assumptions specified in the attainment or maintenance demonstration, and
- SIP prohibitions, numerical emission limits, and work practice requirements.

E.4 FINAL DRAFT CLEAN AIR ACT CONFORMITY DETERMINATION, FACILITIES TO SUPPORT US PACIFIC FLEET F/A-18E/F AIRCRAFT AT NAS LEMOORE

E.4.1 Applicability Analysis

NAS Lemoore straddles the boundary between Fresno and Kings Counties, California. Both Fresno County and Kings County are part of the San Joaquin Valley Air Basin. The San Joaquin Valley Air Basin is designated a severe ozone nonattainment area and a severe PM_{10} nonattainment area. As indicated subsequently in Table E-102, direct and indirect emissions of ozone and PM_{10} precursors associated with proposed action exceed the *de minimis* thresholds of 50 tons per year for ozone precursors and 70 tons per year for PM_{10}. Consequently, Clean Air Act conformity determination requirements apply to development of facilities to support F/A-18E/F aircraft at NAS Lemoore.

Some emission sources associated with the proposed action are exempt from consideration under the general conformity rule. Exempt emission sources include stationary sources that require permits from the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD), and which are therefore subject to the District's new source review (NSR) requirements. In addition, emission sources that are not under Navy control are exempt from the general conformity rule.

Various new facilities would be needed at NAS Lemoore to support the F/A-18E/F squadrons. Some of these facilities would include equipment that would require air quality permits from the SJVUAPCD. Facilities and equipment covered by new, existing, or amended, SJVUAPCD permits are exempt from consideration in a conformity determination. Examples of emission sources that are exempt from consideration in a conformity determination include engine test cells; boilers used for space heating and water heating; and various painting, degreasing, and abrasive blasting facilities used for aircraft and engine maintenance.

Some portable equipment associated with aircraft maintenance activities plus some equipment associated with aircraft flight operations may be subject to SJVUAPCD permit requirements. For some of this equipment, the Navy has the

option of registering the equipment as a mobile source instead of having it permitted as a stationary source. For purposes of this conformity determination, all such equipment has been treated as permit-exempt mobile source equipment, and included in the conformity analysis.

E.4.2 Summary of Added Emissions

Conformity-related emission estimates for the F/A-18E/F action are summarized in Table E-102. The maximum annual conformity-related emissions will be 340.12 tons per year of reactive organic compounds, 304.77 tons per year of nitrogen oxides, and 167.86 tons per year of PM_{10}. These emission increases exceed the relevant *de minimis* levels for the San Joaquin Valley (50 tons per year for reactive organic compounds and nitrogen oxides, 70 tons per year for PM_{10}). Consequently, the conformity determination for facilities to support F/A-18E/F aircraft basing at NAS Lemoore needs to address both ozone and PM_{10} emissions.

E.4.3 Options for Demonstrating Conformity with the Ozone and PM_{10} SIPS for the San Joaquin Valley

The Record of Decision for the recent closure of Castle Air Force Base transferred conformity-related emission offsets to NAS Lemoore in the amounts of 100 tons per year for reactive organic compounds, 367.1 tons per year for nitrogen oxides, and 151.6 tons per year for PM_{10}. The transferred emission offset quantities are insufficient to compensate for the anticipated increases in reactive organic compound and PM_{10} emissions, but exceed the anticipated increase in nitrogen oxide emissions. The Navy needs to address a deficiency of 240.12 tons per year in reactive organic compound emissions and 16.26 tons per year in PM_{10} emissions.

In addition to transferring conformity-relate emission offsets to NAS Lemoore when Castle Air Force Base was closed, the Air Force also transferred 2,311.2 tons per year of reactive organic compound offsets and 642.7 tons per year of nitrogen oxide offsets to the Federal Aviation Administration (FAA). Discussions between the Navy and FAA have resulted in the FAA agreeing to provide NAS Lemoore with an additional 218.28 tons per year of reactive organic compound offsets (a value based on information contained in the Draft EIS and Draft Conformity Determination). The letter from the FAA to the Navy establishing this transfer is included as Attachment A.

As indicated in Table E-102, the FAA transfer of reactive organic compound offsets leaves a deficiency of 21.84 tons per year of reactive organic compound emissions, a deficiency of 16.26 tons per year of PM_{10} emissions, and a surplus of 62.33 tons per year of nitrogen oxide emissions.

The SJVUAPCD recognizes reactive organic compounds and nitrogen oxides as ozone precursors. In addition, the SJVUAPCD recognizes reactive organic compounds and nitrogen oxides as PM_{10} precursors. Discussions with staff of the SJVUAPCD indicate support for interpollutant compensation among ozone and

PM_{10} precursors for purposes of demonstrating Clean Air Act conformity, particularly when nitrogen oxide emissions are used to compensate for reactive organic compound or PM_{10} emissions. Thus, the surplus of 62.33 tons per year in nitrogen oxide conformity offsets obtained with the closure of Castle Air Force Base can offset the reactive organic compound and PM_{10} deficiencies noted above. After using 16.26 tons per year of the nitrogen oxide conformity offset surplus to compensate for the PM_{10} deficiency and 21.84 tons per year of the nitrogen oxide conformity offset surplus to compensate for the reactive organic compound deficiency, 24.24 tons per year of nitrogen oxide emissions offsets will remain unused.

E.4.4 Statement Of Conformity

Maximum conformity-related emissions increases associated with facilities to support F/A-18E/F aircraft at NAS Lemoore amount to 340.12 tons per year of reactive organic compounds, 304.77 tons per year of nitrogen oxides, and 167.86 tons per year of PM_{10}. These conformity-related emissions have been largely compensated by mobile source emission offsets previously obtained by NAS Lemoore during the closure of Castle Air Force Base plus additional reactive organic compound offsets transferred by the FAA. The remaining pollutant-specific deficiencies and surpluses are: a deficiency of 21.84 tons per year for reactive organic compounds; a surplus of 62.33 tons per year for nitrogen oxides; and a deficiency of 16.26 tons per year for PM_{10}.

The SJVUAPCD recognizes interpollutant trading for purposes of demonstrating Clean Air Act conformity. Nitrogen oxides are recognized by the SJVUAPCD as both ozone and PM_{10} precursors. The surplus conformity offsets of nitrogen oxide emissions are more than sufficient to provide interpollutant offsets that address the reactive organic compound and PM_{10} conformity offset requirements. Consequently Clean Air Act Conformity is demonstrated pursuant to 40 CFR 51.858(a)(2) and 40 CFR 58.858(a)(5)(iii). The Record of Decision for this action will provide an enforceable mechanism for implementing the emission offsets as required by EPA's general conformity rule.

NAS Lemoore will follow SJVUAPCD procedures to ensure that new, relocated, or modified facilities and equipment meet applicable rules and regulations (including all SIP requirements) prior to facility construction or installation.

E.5 Draft Clean Air Act Conformity Determination, Facilities to Support US Pacific Fleet F/A-18E/F Aircraft at NAF El Centro

E.5.1 Applicability Analysis

NAF El Centro is located in the portion of Imperial County, California that is included within the Salton Sea Air Basin. The Salton Sea Air Basin is designated a transitional ozone nonattainment area and a moderate PM_{10} nonattainment area. The *de minimis* thresholds applicable to the Salton Sea Air Basin are 100 tons per year for reactive organic compounds, 100 tons per year for nitrogen oxides, and

100 tons per year for PM_{10}. As indicated subsequently in Table E-103, direct and indirect emissions of ozone and PM_{10} precursors associated with proposed action exceed the *de minimis* thresholds for ozone precursors and PM_{10}. Consequently, Clean Air Act conformity determination requirements apply to development of facilities to support F/A-18E/F aircraft at NAF El Centro.

Some emission sources associated with the proposed NAF El Centro Alternative are exempt from consideration under the general conformity rule. Exempt emission sources include stationary sources that require permits from the Imperial County Air Pollution Control District (APCD), and which are therefore subject to the District's new source review (NSR) requirements. In addition, emission sources that are not under Navy control are exempt from the general conformity rule.

Various new facilities would be needed at NAF El Centro to support the F/A-18E/F squadrons. Some of these facilities would include equipment that would require air quality permits from the Imperial County APCD. Facilities and equipment covered by new, existing, or amended, APCD permits are exempt from consideration in a conformity determination. Examples of emission sources that are exempt from consideration in a conformity determination include engine test cells; boilers used for space heating and water heating; and various painting, degreasing, and abrasive blasting facilities used for aircraft and engine maintenance.

Some portable equipment associated with aircraft maintenance activities plus some equipment associated with aircraft flight operations may be subject to APCD permit requirements. For some of this equipment, the Navy has the option of registering the equipment as a mobile source instead of having it permitted as a stationary source. For purposes of this conformity determination, all such equipment has been treated as permit-exempt mobile source equipment, and included in the conformity analysis.

Vehicle travel associated with added military and civilian personnel has been separated into base-related commute travel and other household travel (primarily shopping and other nonwork trips). Emissions associated with base-related commute travel are included in the conformity analysis. Emissions associated with other household travel are not under Navy control, and are excluded from the conformity analysis. Emissions associated with off-base housing units (space heating, water heating, etc.) are not under Navy control, and are excluded from the conformity analysis.

E.5.2 Summary of Added Emissions

Conformity-related emission estimates for the F/A-18E/F action are summarized in Table E-103. The maximum annual conformity-related emissions would be 495.35 tons per year of reactive organic compounds, 414.62 tons per year of nitrogen oxides, and 235.48 tons per year of PM_{10}. These emission increases

exceed the relevant *de minimis* levels for the Salton Sea Air Basin (100 tons per year each for reactive organic compounds, nitrogen oxides, and PM_{10}). Consequently, selection of the NAF El Centro Alternative would require a conformity determination that addresses both ozone and PM_{10} precursor emissions.

E.5.3 Options for Demonstrating Conformity with the Ozone and PM_{10} SIPS for the Salton Sea Air Basin

The conformity-related increases in emissions of ozone and PM_{10} precursors can be addressed in one of two ways:

- By the Navy obtaining a commitment from the Imperial County APCD to modify the ozone and PM_{10} SIPs to specifically account for the F/A-18E/F action at NAF El Centro; or
- By the Navy obtaining adequate ozone precursor and PM_{10} emission offsets (495.35 tons per year of reactive organic compounds, 414.62 tons per year of nitrogen oxides, and 235.48 tons per year of PM_{10}) from a combination of on-base sources and off-base sources within the Salton Sea Air Basin.

The two general approaches noted above could be combined, with the Navy arranging partial offsets for conformity-related emissions increases and the Imperial County APCD modifying the ozone and PM_{10} SIPs to accommodate the remaining increases.

E.5.4 Statement of Conformity

Because the NAF El Centro Alternative is not the preferred alternative, implementation of the conformity demonstration options noted above has not been pursued at this time. Should the NAF El Centro Alternative be chosen for implementation, the Record of Decision for implementing that alternative would be delayed pending satisfactory implementation of one or a combination of the conformity demonstration options noted above. In addition, a conformity analysis document outlining the intended mechanisms for the demonstration of conformity would be circulated for public and agency comment to satisfy the requirements of the EPA general conformity rule.

NAF El Centro would follow Imperial County APCD procedures to ensure that new, relocated, or modified facilities and equipment meet applicable rules and regulations (including all SIP requirements) prior to facility construction or installation.

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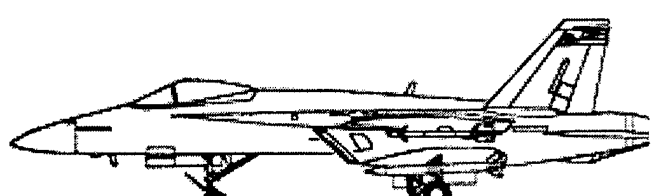

CONSTRUCTION EMISSIONS ANALYSIS

TABLE E-1. ESTIMATED CONSTRUCTION SITE ACREAGES FOR NAS LEMOORE ALTERNATIVE

ALTERNATIVE	FACILITY	FACILITY FOOTPRINT (SQ FEET)	DISTURBED SITE MULTIPLIER	GROSS SITE ACRES	YEAR
NAS LEMOORE	NAMTRA	24,006	1.25	0.69	1999
	WEAPONS SCHOOL	6,943	1.5	0.24	1999
	ENGINE SHOP	12,003	1.5	0.41	1999
	ARMAMENT SHOP	45,008	1.5	1.55	1999
	BEQ (358)	73,390	4	6.74	1999
	FAMILY HOUSING (100)	120,000	4	11.02	1999
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	1999 SUBTOTAL	281,350		20.65	1999
	CHILD CENTER	17,224	2	0.79	2000
	YOUTH CENTER	8,451	2	0.39	2000
	FAMILY HOUSING (100)	120,000	4	11.02	2000
	------------------	---------		-------	-------
	2000 SUBTOTAL	145,675		12.20	2000
	FAMILY HOUSING (100)	120,000	4	11.02	2001
	COUNSELING CENTER	15,900	1.5	0.55	2001
	------------------	---------		-------	-------
	2001 SUBTOTAL	135,900		11.57	2001
	FAMILY HOUSING (99)	118,800	4	10.91	2002
	------------------	---------		-------	-------
	2002 SUBTOTAL	118,800		10.91	2002

Notes: The disturbed site multiplier converts facility size into an approximate construction site size (in square feet), including allowances for landscaping, parking, and access roads.
BEQ and BOQ facilities are assumed to be two story buildings.

TABLE E-2. CONSTRUCTION ASSUMPTIONS FOR 1999 PROJECTS, NAS LEMOORE ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	30%	30%
area subject to surface disturbance	==>	21 acres	14 acres
typical area disturbed on any one day	==>	21 acres	14 acres
duration of activity phase on any area	==>	45 days	120 days
dust control program effectiveness	==>	55%	55%
Nominal Construction Period by Phase:		45 days	120 days
Nominal Overall Construction Period:		165 days	
Fugitive Dust PM10 Rate, lb/acre-day:		10.8 lbs/ac-d	10.8 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			2	4
cold planers and wheeled dozers	==>	4	6		
scraper	==>	4	6		
motor grader	==>	2	4		
wheeled loader	==>	6	6	2	4
track-type loader	==>				
off-highway truck	==>	6	6	6	4
static and vibratory rollers	==>			2	4
excavators/crawlers, trenchers	==>	4	4		
concrete pavers, asphalt pavers	==>			2	6
cranes and miscellaneous equipment	==>			4	4
Total Number of Construction Vehicles:			26		18
Construction Equipment Fuel Use Estimate, gallons/day:			1,534		563
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.7		7.4
Cumulative Hours of Heavy Equipment Use:			6,480		9,120
Total Cumulative Hours of Heavy Equipment Use:				15,600	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

TABLE E-3. 1999 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAS LEMOORE ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.7	10.0	3.8	1.0	5.8
Facility Construction Emissions	0.8	10.8	5.9	1.1	9.8
Total Construction Period Emissions	1.4	20.7	9.7	2.1	14.4

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	120 days
Nominal Acre-Days for Site and Foundation Preparation:	945 acre-days
Nominal Acre-Days for Facility Construction:	1,680 acre-days
Equipment Use for Site and Foundation Preparation:	6,480 vehicle-hours
Equipment Use for Facility Construction:	9,120 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	6.86 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.43 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

Data Sources: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-4. CONSTRUCTION ASSUMPTIONS FOR 2000 PROJECTS, NAS LEMOORE ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	30%	30%
area subject to surface disturbance	==>	12 acres	9 acres
typical area disturbed on any one day	==>	12 acres	9 acres
duration of activity phase on any area	==>	45 days	105 days
dust control program effectiveness	==>	55%	55%
Nominal Construction Period by Phase:		45 days	105 days
Nominal Overall Construction Period:		150 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		10.8 lbs/ac-d	10.8 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			2	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	4	6	2	4
track-type loader	==>				
off-highway truck	==>	5	6	4	4
static and vibratory rollers	==>			1	4
excavators/crawlers, trenchers	==>	3	4		
concrete pavers, asphalt pavers	==>			1	6
cranes and miscellaneous equipment	==>			2	4
Total Number of Construction Vehicles:			18		12
Construction Equipment Fuel Use Estimate, gallons/day:			1,006		375
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.3		7.5
Cumulative Hours of Heavy Equipment Use:			4,410		5,250
Total Cumulative Hours of Heavy Equipment Use:				9,660	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

TABLE E-5. 2000 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAS LEMOORE ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.4	6.6	2.6	0.7	3.4
Facility Construction Emissions	0.5	6.3	3.8	0.6	5.6
Total Construction Period Emissions	0.9	12.8	6.4	1.3	8.9

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	105 days
Nominal Acre-Days for Site and Foundation Preparation:	540 acre-days
Nominal Acre-Days for Facility Construction:	945 acre-days
Equipment Use for Site and Foundation Preparation:	4,410 vehicle-hours
Equipment Use for Facility Construction:	5,250 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.17 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.56 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-6. CONSTRUCTION ASSUMPTIONS FOR 2001 PROJECTS, NAS LEMOORE ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	=>	30%	30%
area subject to surface disturbance	=>	12 acres	8 acres
typical area disturbed on any one day	=>	12 acres	8 acres
duration of activity phase on any area	=>	45 days	105 days
dust control program effectiveness	=>	55%	55%
Nominal Construction Period by Phase:		45 days	105 days
Nominal Overall Construction Period:		150 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		10.8 lbs/ac-d	10.8 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	=>				
wheeled tractor	=>			1	4
cold planers and wheeled dozers	=>	2	6		
scraper	=>	2	6		
motor grader	=>	2	4		
wheeled loader	=>	4	6	2	4
track-type loader	=>				
off-highway truck	=>	5	6	4	4
static and vibratory rollers	=>			1	4
excavators/crawlers, trenchers	=>	3	4		
concrete pavers, asphalt pavers	=>			1	4
cranes and miscellaneous equipment	=>			2	4
Total Number of Construction Vehicles:			18		11
Construction Equipment Fuel Use Estimate, gallons/day:			1,006		354
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.3		8.0
Cumulative Hours of Heavy Equipment Use:			4,410		4,620
Total Cumulative Hours of Heavy Equipment Use:				9,030	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

TABLE E-7. 2001 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAS LEMOORE ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.4	6.6	2.6	0.7	3.4
Facility Construction Emissions	0.4	5.8	3.0	0.6	4.9
Total Construction Period Emissions	0.8	12.4	5.6	1.3	8.3

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	105 days
Nominal Acre-Days for Site and Foundation Preparation:	540 acre-days
Nominal Acre-Days for Facility Construction:	840 acre-days
Equipment Use for Site and Foundation Preparation:	4,410 vehicle-hours
Equipment Use for Facility Construction:	4,620 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.17 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.50 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-8. CONSTRUCTION ASSUMPTIONS FOR 2002 PROJECTS, NAS LEMOORE ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	30%	30%
area subject to surface disturbance	==>	11 acres	8 acres
typical area disturbed on any one day	==>	11 acres	8 acres
duration of activity phase on any area	==>	45 days	105 days
dust control program effectiveness	==>	55%	55%
Nominal Construction Period by Phase:		45 days	105 days
Nominal Overall Construction Period:		150 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		10.8 lbs/ac-d	10.8 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	3	6	2	4
track-type loader	==>				
off-highway truck	==>	4	6	4	4
static and vibratory rollers	==>			1	4
excavators/crawlers, trenchers	==>	3	4		
concrete pavers, asphalt pavers	==>			1	4
cranes and miscellaneous equipment	==>			2	4
Total Number of Construction Vehicles:			16		11
Construction Equipment Fuel Use Estimate, gallons/day:			884		354
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.3		8.0
Cumulative Hours of Heavy Equipment Use:			3,870		4,620
Total Cumulative Hours of Heavy Equipment Use:				8,490	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

TABLE E-9. 2002 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAS LEMOORE ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.4	5.8	2.2	0.6	3.1
Facility Construction Emissions	0.4	5.8	3.0	0.6	4.9
Total Construction Period Emissions	0.8	11.6	5.2	1.2	8.0

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	105 days
Nominal Acre-Days for Site and Foundation Preparation:	495 acre-days
Nominal Acre-Days for Facility Construction:	840 acre-days
Equipment Use for Site and Foundation Preparation:	3,870 vehicle-hours
Equipment Use for Facility Construction:	4,620 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.82 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.50 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of comprehensive fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-10. ESTIMATED CONSTRUCTION SITE ACREAGES FOR NAF EL CENTRO ALTERNATIVE

ALTERNATIVE	FACILITY	FACILITY FOOTPRINT (SQ FEET)	DISTURBED SITE MULTIPLIER	GROSS SITE ACRES	YEAR
NAF EL CENTRO	RUNWAY 2	1,800,000	1.1	45.45	1999
	TAXIWAYS	112,500	1.1	2.84	1999
	FRS HANGAR	78,420	1.25	2.25	1999
	NAMTRA	20,400	1.25	0.59	1999
	WEAPONS SCHOOL	11,875	1.25	0.34	1999
	FLIGHT SIMULATOR	600	1.25	0.02	1999
	SQUADRON HANGAR	27,957	1.25	0.80	1999
	ENGINE TEST CELL	5,950	1.5	0.20	1999
	AIRFRAME SHOP	19,046	1.5	0.66	1999
	ENGINE SHOP	4,000	1.25	0.11	1999
	AVIONICS SHOP	22,000	1.25	0.63	1999
	ARMAMENT SHOP	8,400	1.25	0.24	1999
	LIFE SUPPORT SHOP	5,000	1.25	0.14	1999
	BATTERY SHOP	1,500	1.25	0.04	1999
	GENERAL WAREHOUSE	25,000	1.25	0.72	1999
	BOQ (134)	40,200	4	3.69	1999
	BEQ (323)	66,215	4	6.08	1999
	FAMILY HOUSING (100)	120,000	4	11.02	1999
	1999 SUBTOTAL	2,369,063		75.83	1999
	GSE SHOP	24,000	1.5	0.83	2000
	GSE SHED	1,950	1.25	0.06	2000
	STORAGE SHED	10,000	1.25	0.29	2000
	OPEN STORAGE AREA	10,000	1.1	0.25	2000
	FUEL TANK STORAGE	600	1.5	0.02	2000
	ADMIN. OFFICES	18,000	2	0.83	2000
	DINING FACILITY	22,543	2	1.04	2000
	NEX FOOD SERVICE	5,400	2	0.25	2000
	COMMISSARY	4,000	2	0.18	2000
	ENLISTED CLUB	14,400	1.5	0.50	2000
	MINISTRY FACILITY	12,320	1.25	0.35	2000
	CHILD CENTER	32,778	1.25	0.94	2000
	YOUTH CENTER	8,550	1.25	0.25	2000
	BEQ (323)	66,215	4	6.08	2000
	FAMILY HOUSING (100)	120,000	4	11.02	2000
	2000 SUBTOTAL	350,756		22.87	2000

TABLE E-10. ESTIMATED CONSTRUCTION SITE ACREAGES FOR NAF EL CENTRO ALTERNATIVE

ALTERNATIVE	FACILITY	FACILITY FOOTPRINT (SQ FEET)	DISTURBED SITE MULTIPLIER	GROSS SITE ACRES	YEAR
NAF EL CENTRO	CREDIT UNION	3,500	1.25	0.10	2001
	CRAFTS SHOP	4,000	1.25	0.11	2001
	AUTOMOTIVE SHOP	3,271	1.5	0.11	2001
	RENTAL CENTER	6,570	1.5	0.23	2001
	FAMILY HOUSING (100)	120,000	4	11.02	2001
	2001 SUBTOTAL	137,341		11.57	2001
	BOWLING CENTER	2,591	1.5	0.09	2002
	FITNESS CENTER	5,001	1.5	0.17	2002
	PLAYING COURTS	1,200	1.5	0.04	2002
	FAMILY HOUSING (100)	120,000	4	11.02	2002
	2002 SUBTOTAL	128,792		11.32	2002
	NAMTRA	17,400	1.25	0.50	2005
	WEAPONS SCHOOL	13,360	1.25	0.38	2005
	FLIGHT SIMULATOR	124,767	1.25	3.58	2005
	SQUADRON HANGAR	88,472	1.25	2.54	2005
	AIRFRAME SHOP	6,884	1.5	0.24	2005
	ENGINE SHOP	58,876	1.25	1.69	2005
	ENGINE TEST CELL	8,180	1.5	0.28	2005
	AVIONICS SHOP	40,233	1.25	1.15	2005
	LIFE SUPPORT SHOP	4,020	1.25	0.12	2005
	BATTERY SHOP	1,325	1.25	0.04	2005
	GENERAL WAREHOUSE	208,949	1.25	6.00	2005
	FAMILY HOUSING (75)	90,000	.4	8.26	2005
	2005 SUBTOTAL	662,466		24.78	2005

TABLE E-10. ESTIMATED CONSTRUCTION SITE ACREAGES FOR NAF EL CENTRO ALTERNATIVE

ALTERNATIVE	FACILITY	FACILITY FOOTPRINT (SQ FEET)	DISTURBED SITE MULTIPLIER	GROSS SITE ACRES	YEAR
NAF EL CENTRO	FUEL TANK STORAGE	600	1.5	0.02	2006
	GENERAL WAREHOUSE	208,949	1.25	6.00	2006
	STORAGE SHED	7,500	1.25	0.22	2006
	OPEN STORAGE AREA	28,138	1.1	0.71	2006
	ADMIN. OFFICES	84,741	2	3.89	2006
	EXCHANGE	4,830	2	0.22	2006
	COMMISSARY	76,000	2	3.49	2006
	ENLISTED CLUB	42,602	1.5	1.47	2006
	YOUTH CENTER	8,737	1.25	0.25	2006
	MINISTRY FACILITY	22,572	1.25	0.65	2006
	BEQ (323)	66,215	4	6.08	2006
	FAMILY HOUSING (75)	90,000	4	8.26	2006
	2006 SUBTOTAL	640,884		31.25	2006
	GENERAL WAREHOUSE	208,949	1.25	6.00	2007
	OPEN STORAGE AREA	28,138	1.1	0.71	2007
	CREDIT UNION	4,700	1.25	0.13	2007
	CRAFTS SHOP	10,520	1.25	0.30	2007
	AUTOMOTIVE SHOP	6,666	1.5	0.23	2007
	BEQ (323)	66,215	4	6.08	2007
	FAMILY HOUSING (75)	90,000	4	8.26	2007
	2007 SUBTOTAL	415,188		21.72	2007
	OPEN STORAGE AREA	28,138	1.1	0.71	2008
	BOWLING CENTER	19,120	1.5	0.66	2008
	PLAYING COURTS	1,348	1.5	0.05	2008
	FAMILY HOUSING (75)	90,000	4	8.26	2008
	2008 SUBTOTAL	138,606		9.68	2008
	FAMILY HOUSING (75)	90,000	4	8.26	2009
	2009 SUBTOTAL	90,000		8.26	2009

Notes: The disturbed site multiplier converts facility size into an approximate construction site size (in square feet), including allowances for landscaping, parking, and access roads.
BEQ and BOQ facilities are assumed to be two story buildings.

TABLE E-11. CONSTRUCTION ASSUMPTIONS FOR 1999 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	76 acres	21 acres
typical area disturbed on any one day	==>	25 acres	21 acres
duration of activity phase on any area	==>	45 days	150 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		137 days	150 days
Nominal Overall Construction Period:		287 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>	2	6	2	4
cold planers and wheeled dozers	==>	4	6		
scraper	==>	4	6		
motor grader	==>	4	4		
wheeled loader	==>	6	6	2	4
track-type loader	==>				
off-highway truck	==>	6	6	8	4
static and vibratory rollers	==>			3	4
excavators/crawlers, trenchers	==>	4	4		
concrete pavers, asphalt pavers	==>			6	6
cranes and miscellaneous equipment	==>			4	4
Total Number of Construction Vehicles:		30			25
Construction Equipment Fuel Use Estimate, gallons/day:		1,592			796
Mean Fuel Consumption Rate, gallons/vehicle-hour:		9.7			7.1
Cumulative Hours of Heavy Equipment Use:		22,435			16,800
Total Cumulative Hours of Heavy Equipment Use:				39,235	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-12. 1999 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	2.2	31.7	14.7	3.2	16.0
Facility Construction Emissions	1.3	19.3	9.7	1.9	14.0
Total Construction Period Emissions	3.5	51.0	24.4	5.1	30.0

Nonimal Site and Foundation Preparation Period:	137 days
Nominal Facility Construction Period:	150 days
Nominal Acre-Days for Site and Foundation Preparation:	3,420 acre-days
Nominal Acre-Days for Facility Construction:	3,150 acre-days
Equipment Use for Site and Foundation Preparation:	22,435 vehicle-hours
Equipment Use for Facility Construction:	16,800 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	6.56 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.33 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-13. CONSTRUCTION ASSUMPTIONS FOR 2000 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
PM10 portion of fugitive TSP	==>	20%		20%	
area subject to surface disturbance	==>	23	acres	15	acres
typical area disturbed on any one day	==>	15	acres	15	acres
duration of activity phase on any area	==>	45	days	125	days
dust control program effectiveness	==>	50%		50%	
Nominal Construction Period by Phase:		69	days	125	days
Nominal Overall Construction Period:		194 days			
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0	lbs/ac-d	8.0	lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>	1	6	1	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	3	6		
motor grader	==>	3	4		
wheeled loader	==>	4	6	2	4
track-type loader	==>				
off-highway truck	==>	5	6	6	4
static and vibratory rollers	==>			2	4
excavators/crawlers, trenchers	==>	3	4		
concrete pavers, asphalt pavers	==>			3	6
cranes and miscellaneous equipment	==>			4	4
Total Number of Construction Vehicles:			21		18
Construction Equipment Fuel Use Estimate, gallons/day:			1,124		578
Mean Fuel Consumption Rate, gallons/vehicle-hour:			9.9		7.4
Cumulative Hours of Heavy Equipment Use:			7,866		9,750
Total Cumulative Hours of Heavy Equipment Use:				17,616	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-14. 2000 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.8	11.2	4.9	1.2	5.0
Facility Construction Emissions	0.8	11.5	5.5	1.1	8.3
Total Construction Period Emissions	1.6	22.8	10.4	2.3	13.3

Nonimal Site and Foundation Preparation Period:	69 days
Nominal Facility Construction Period:	125 days
Nominal Acre-Days for Site and Foundation Preparation:	1,035 acre-days
Nominal Acre-Days for Facility Construction:	1,875 acre-days
Equipment Use for Site and Foundation Preparation:	7,866 vehicle-hours
Equipment Use for Facility Construction:	9,750 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.60 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.20 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-15. CONSTRUCTION ASSUMPTIONS FOR 2001 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	12 acres	8 acres
typical area disturbed on any one day	==>	12 acres	8 acres
duration of activity phase on any area	==>	45 days	120 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		45 days	120 days
Nominal Overall Construction Period:		165 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	4	6	2	4
track-type loader	==>				
off-highway truck	==>	5	6	4	4
static and vibratory rollers	==>			1	4
excavators/crawlers, trenchers	==>	3	4		
concrete pavers, asphalt pavers	==>			1	6
cranes and miscellaneous equipment	==>			2	4
Total Number of Construction Vehicles:			18		11
Construction Equipment Fuel Use Estimate, gallons/day:			1,006		363
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.3		7.9
Cumulative Hours of Heavy Equipment Use:			4,410		5,520
Total Cumulative Hours of Heavy Equipment Use:				9,930	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-16. 2001 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.4	6.6	2.6	0.7	2.6
Facility Construction Emissions	0.5	6.8	3.5	0.7	4.3
Total Construction Period Emissions	0.9	13.4	6.1	1.4	7.0

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	120 days
Nominal Acre-Days for Site and Foundation Preparation:	540 acre-days
Nominal Acre-Days for Facility Construction:	960 acre-days
Equipment Use for Site and Foundation Preparation:	4,410 vehicle-hours
Equipment Use for Facility Construction:	5,520 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.17 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.75 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-17. CONSTRUCTION ASSUMPTIONS FOR 2002 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	11 acres	8 acres
typical area disturbed on any one day	==>	11 acres	8 acres
duration of activity phase on any area	==>	45 days	120 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		45 days	120 days
Nominal Overall Construction Period:		165 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	4	6	2	4
track-type loader	==>				
off-highway truck	==>	4	6	4	4
static and vibratory rollers	==>	3		1	4
excavators/crawlers, trenchers	==>	2	4		
concrete pavers, asphalt pavers	==>			1	6
cranes and miscellaneous equipment	==>			2	4
Total Number of Construction Vehicles:			19		11
Construction Equipment Fuel Use Estimate, gallons/day:			901		363
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.2		7.9
Cumulative Hours of Heavy Equipment Use:			3,960		5,520
Total Cumulative Hours of Heavy Equipment Use:				9,480	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-18. 2002 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

	Construction Period Emissions (tons)				
Construction Phase	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.4	5.9	2.3	0.6	2.4
Facility Construction Emissions	0.5	6.8	3.5	0.7	4.3
Total Construction Period Emissions	0.9	12.7	5.8	1.3	6.7

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	120 days
Nominal Acre-Days for Site and Foundation Preparation:	495 acre-days
Nominal Acre-Days for Facility Construction:	960 acre-days
Equipment Use for Site and Foundation Preparation:	3,960 vehicle-hours
Equipment Use for Facility Construction:	5,520 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.00 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.75 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-19. CONSTRUCTION ASSUMPTIONS FOR 2005 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	25 acres	10 acres
typical area disturbed on any one day	==>	15 acres	10 acres
duration of activity phase on any area	==>	45 days	150 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		75 days	150 days
Nominal Overall Construction Period:		225 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>	1	6	2	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	3	4		
wheeled loader	==>	4	6	2	4
track-type loader	==>				
off-highway truck	==>	5	6	5	4
static and vibratory rollers	==>			2	4
excavators/crawlers, trenchers	==>	3	4		
concrete pavers, asphalt pavers	==>			3	6
cranes and miscellaneous equipment	==>			4	4
Total Number of Construction Vehicles:			20		18
Construction Equipment Fuel Use Estimate, gallons/day:			1,035		531
Mean Fuel Consumption Rate, gallons/vehicle-hour:			9.6		6.8
Cumulative Hours of Heavy Equipment Use:			8,100		11,700
Total Cumulative Hours of Heavy Equipment Use:				19,800	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-20. 2005 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.8	11.4	5.1	1.2	5.3
Facility Construction Emissions	1.0	13.0	7.1	1.2	7.0
Total Construction Period Emissions	1.7	24.3	12.2	2.4	12.3

Nonimal Site and Foundation Preparation Period:	75 days
Nominal Facility Construction Period:	150 days
Nominal Acre-Days for Site and Foundation Preparation:	1,125 acre-days
Nominal Acre-Days for Facility Construction:	1,500 acre-days
Equipment Use for Site and Foundation Preparation:	8,100 vehicle-hours
Equipment Use for Facility Construction:	11,700 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.20 hours/acre-day
Normalized Equipment Use, Facility Construction:	7.80 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-21. CONSTRUCTION ASSUMPTIONS FOR 2006 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	31 acres	17 acres
typical area disturbed on any one day	==>	15 acres	17 acres
duration of activity phase on any area	==>	45 days	150 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		93 days	150 days
Nominal Overall Construction Period:		243 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>	1	6	2	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	3	6		
motor grader	==>	3	4		
wheeled loader	==>	4	6	3	4
track-type loader	==>				
off-highway truck	==>	5	6	7	4
static and vibratory rollers	==>			2	4
excavators/crawlers, trenchers	==>	4	4		
concrete pavers, asphalt pavers	==>			4	6
cranes and miscellaneous equipment	==>			4	4
Total Number of Construction Vehicles:			22		22
Construction Equipment Fuel Use Estimate, gallons/day:			1,142		698
Mean Fuel Consumption Rate, gallons/vehicle-hour:			9.7		7.3
Cumulative Hours of Heavy Equipment Use:			10,974		14,400
Total Cumulative Hours of Heavy Equipment Use:				25,374	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-22. 2006 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	1.1	15.5	6.8	1.6	6.7
Facility Construction Emissions	1.2	16.8	8.7	1.6	11.4
Total Construction Period Emissions	2.3	32.3	15.4	3.2	18.2

Nonimal Site and Foundation Preparation Period:	93 days
Nominal Facility Construction Period:	150 days
Nominal Acre-Days for Site and Foundation Preparation:	1,395 acre-days
Nominal Acre-Days for Facility Construction:	2,550 acre-days
Equipment Use for Site and Foundation Preparation:	10,974 vehicle-hours
Equipment Use for Facility Construction:	14,400 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.87 hours/acre-day
Normalized Equipment Use, Facility Construction:	5.65 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-23. CONSTRUCTION ASSUMPTIONS FOR 2007 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	22 acres	12 acres
typical area disturbed on any one day	==>	12 acres	12 acres
duration of activity phase on any area	==>	45 days	150 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		83 days	150 days
Nominal Overall Construction Period:		233 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>	1	6	2	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	3	6	2	4
track-type loader	==>				
off-highway truck	==>	5	6	5	4
static and vibratory rollers	==>			2	4
excavators/crawlers, trenchers	==>	3	4		
concrete pavers, asphalt pavers	==>			3	6
cranes and miscellaneous equipment	==>			4	4
Total Number of Construction Vehicles:			18		18
Construction Equipment Fuel Use Estimate, gallons/day:			989		531
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.1		6.8
Cumulative Hours of Heavy Equipment Use:			8,085		11,700
Total Cumulative Hours of Heavy Equipment Use:				19,785	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-24. 2007 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.8	11.9	5.4	1.2	4.8
Facility Construction Emissions	1.0	13.0	7.1	1.2	8.2
Total Construction Period Emissions	1.7	24.9	12.5	2.5	13.0

Nonimal Site and Foundation Preparation Period:	83 days
Nominal Facility Construction Period:	150 days
Nominal Acre-Days for Site and Foundation Preparation:	990 acre-days
Nominal Acre-Days for Facility Construction:	1,800 acre-days
Equipment Use for Site and Foundation Preparation:	8,085 vehicle-hours
Equipment Use for Facility Construction:	11,700 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.17 hours/acre-day
Normalized Equipment Use, Facility Construction:	6.50 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-25. CONSTRUCTION ASSUMPTIONS FOR 2008 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	20%	20%
area subject to surface disturbance	==>	10 acres	6 acres
typical area disturbed on any one day	==>	10 acres	6 acres
duration of activity phase on any area	==>	45 days	150 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		45 days	150 days
Nominal Overall Construction Period:		195 days	
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0 lbs/ac-d	8.0 lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	2	6	1	4
track-type loader	==>				
off-highway truck	==>	4	6	3	4
static and vibratory rollers	==>			1	4
excavators/crawlers, trenchers	==>	2	4		
concrete pavers, asphalt pavers	==>			2	6
cranes and miscellaneous equipment	==>			2	4
Total Number of Construction Vehicles:			14		10
Construction Equipment Fuel Use Estimate, gallons/day:			831		308
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.9		7.0
Cumulative Hours of Heavy Equipment Use:			3,420		6,600
Total Cumulative Hours of Heavy Equipment Use:				10,020	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-26. 2008 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.3	5.4	2.1	0.6	2.2
Facility Construction Emissions	0.5	7.5	4.0	0.7	4.1
Total Construction Period Emissions	0.9	12.8	6.1	1.3	6.3

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	150 days
Nominal Acre-Days for Site and Foundation Preparation:	450 acre-days
Nominal Acre-Days for Facility Construction:	900 acre-days
Equipment Use for Site and Foundation Preparation:	3,420 vehicle-hours
Equipment Use for Facility Construction:	6,600 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.60 hours/acre-day
Normalized Equipment Use, Facility Construction:	7.33 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-27. CONSTRUCTION ASSUMPTIONS FOR 2009 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
PM10 portion of fugitive TSP	==>	20%		20%	
area subject to surface disturbance	==>	8	acres	6	acres
typical area disturbed on any one day	==>	8	acres	6	acres
duration of activity phase on any area	==>	45	days	150	days
dust control program effectiveness	==>	50%		50%	
Nominal Construction Period by Phase:		45	days	150	days
Nominal Overall Construction Period:			195 days		
Fugitive Dust PM10 Rate, lbs/acre-day:		8.0	lbs/ac-d	8.0	lbs/ac-d

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	4
cold planers and wheeled dozers	==>	2	6		
scraper	==>	2	6		
motor grader	==>	2	4		
wheeled loader	==>	2	6	1	4
track-type loader	==>				
off-highway truck	==>	4	6	3	4
static and vibratory rollers	==>			1	4
excavators/crawlers, trenchers	==>	2	4		
concrete pavers, asphalt pavers	==>			2	6
cranes and miscellaneous equipment	==>			2	4
Total Number of Construction Vehicles:			14		10
Construction Equipment Fuel Use Estimate, gallons/day:			831		308
Mean Fuel Consumption Rate, gallons/vehicle-hour:			10.9		7.0
Cumulative Hours of Heavy Equipment Use:			3,420		6,600
Total Cumulative Hours of Heavy Equipment Use:				10,020	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE E-28. 2009 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

	Construction Period Emissions (tons)				
Construction Phase	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.3	5.4	2.1	0.6	1.8
Facility Construction Emissions	0.5	7.5	4.0	0.7	4.1
Total Construction Period Emissions	0.9	12.8	6.1	1.3	6.0

Nonimal Site and Foundation Preparation Period:	45 days
Nominal Facility Construction Period:	150 days
Nominal Acre-Days for Site and Foundation Preparation:	360 acre-days
Nominal Acre-Days for Facility Construction:	900 acre-days
Equipment Use for Site and Foundation Preparation:	3,420 vehicle-hours
Equipment Use for Facility Construction:	6,600 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	9.50 hours/acre-day
Normalized Equipment Use, Facility Construction:	7.33 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (sandy loam or sandy clay loam).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume II, Section II-7) and U.S. Environmental Protection Agency 1995 (AP-42, Volume I, Section 13.2.3).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE E-29. CONSTRUCTION ACTIVITY EMISSION FACTORS

EQUIPMENT TYPE	EMISSION RATE, GRAMS/HOUR ROG	NOx	CO	PM10	SOx	FUEL USE (gal/hr)
track-type tractor	53.73	570.70	157.01	50.70	62.30	4.4
wheeled tractor	83.20	575.84	1,622.77	61.50	40.90	2.9
cold planers and wheeled dozers	84.74	1,889.16	816.81	75.00	158.00	14.6
scraper	125.05	1,740.74	568.19	184.00	210.00	14.8
motor grader	17.63	324.43	68.46	27.70	39.00	2.8
wheeled loader	110.43	858.19	259.58	77.90	82.50	5.8
track-type loader	43.47	375.22	91.15	26.40	34.40	2.4
off-highway truck	84.74	1,889.16	816.81	116.00	206.00	14.6
static and vibratory rollers	29.84	392.90	137.97	22.70	30.50	2.1
excavators/crawlers, trenchers	67.67	767.30	306.37	63.20	64.70	4.5
concrete pavers, asphalt pavers	67.67	767.30	306.37	63.20	64.70	4.5
cranes and miscellaneous equipment	67.67	767.30	306.37	63.20	64.70	4.5

FUGITIVE DUST TSP EMISSION RATE: 1.2 TONS/ACRE/MONTH, 30 WORK DAYS/MONTH

SOIL TEXTURE CLASS	PERCENT CLAY + SILT	ESTIMATED % PM10
Clay	55 - 100 %	40 - 85 %
Silt	80 - 100 %	40 - 80 %
Silty Clay	80 - 100 %	40 - 70 %
Silty Loam	50 - 100 %	30 - 70 %
Silty Clay Loam	80 - 100 %	30 - 60 %
Clay Loam	45 - 80 %	30 - 50 %
Loam	45 - 75 %	25 - 45 %
Sandy Clay	35 - 55 %	25 - 45 %
Sandy Clay Loam	20 - 55 %	15 - 40 %
Sandy Loam	15 - 55 %	10 - 30 %
Sand	0 - 15 %	0 - 10 %

Notes:

ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter (below 50 microns aerodynamic equivalent diameter)
SOx = sulfur oxides
TSP = total suspended particulate matter (below 150 microns aerodynamic equivalent diameter)
Clay = soil particles with a sieve diameter below 2 microns (may form large particle aggregates)
Silt = soil particles with a sieve diameter between 2 and 50 microns
Diesel exhaust ROG = 97.58% of TOG (California Air Resources Board EMFAC7F model)

Data Sources:

U.S. Environmental Protection Agency, 1985b: (AP-42, Volume II, Section II-7)
U.S. Environmental Protection Agency, 1995: (AP-42, Volume I, Section 13.2.3).
Wild, Alan. 1993. Soils and the Environment: An Introduction. Cambridge University Press.

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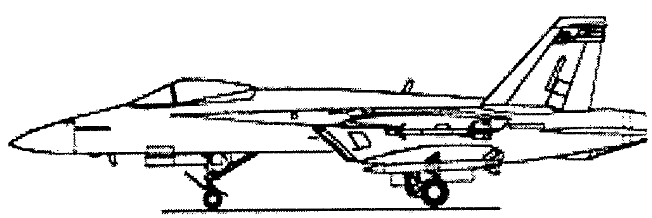

F/A-18 AIRCRAFT EMISSIONS ANALYSIS

TABLE E-30. ESTIMATED ANNUAL F/A-18E/F FLIGHT ACTIVITY

F/A-18E/F SQUADRONS	FLIGHT EVENT	ANNUAL FLIGHT OPERATIONS DAYTIME	EVENING	NIGHT	TOTAL	TOTAL EVENTS
E/F FLEET (PHASE 1) [56 ACFT]	Takeoff	3,622	643	140	4,405	4,405
	Overhead Break Landing	2,817	542	337	3,696	3,696
	Straight-In Landing	549	105	55	709	709
	Touch-and-Go Pattern	1,612	162	80	1,854	927
	FCLP Pattern	4,548	2,622	1,638	8,808	4,404
	GCA Box Pattern	476	146	28	650	325
	ACLS Pattern	22	70	68	160	80
	SUBTOTAL	13,646	4,290	2,346	20,282	14,546
E/F FLEET (PHASE 2) [72 ACFT]	Takeoff	4,657	827	180	5,664	5,664
	Overhead Break Landing	3,622	697	433	4,752	4,752
	Straight-In Landing	706	135	71	912	912
	Touch-and-Go Pattern	2,073	208	103	2,384	1,192
	FCLP Pattern	5,847	3,371	2,106	11,324	5,662
	GCA Box Pattern	612	188	36	836	418
	ACLS Pattern	28	90	86	204	102
	SUBTOTAL	17,545	5,516	3,015	26,076	18,702
E/F FRS [36 ACFT]	Takeoff	7,113	1,356	218	8,687	8,687
	Overhead Break Landing	5,346	774	727	6,847	6,847
	Straight-In Landing	1,200	423	217	1,840	1,840
	Touch-and-Go Pattern	20,424	2,726	2,178	25,328	12,664
	FCLP Pattern	9,392	6,216	3,128	18,736	9,368
	GCA Box Pattern	2,848	1,492	612	4,952	2,476
	ACLS Pattern	102	450	186	738	369
	SUBTOTAL	46,425	13,437	7,266	67,128	42,251
COMBINED E/F SQUADRONS (PHASE 1) [92 ACFT]	Takeoff	10,735	1,999	358	13,092	13,092
	Landing	8,163	1,316	1,064	10,543	10,543
	Overhead Break Landing	1,749	528	272	2,549	2,549
	Touch-and-Go Pattern	22,036	2,888	2,258	27,182	13,591
	FCLP Pattern	13,940	8,838	4,766	27,544	13,772
	GCA Box Pattern	3,324	1,638	640	5,602	2,801
	ACLS Pattern	124	520	254	898	449
	TOTALS	60,071	17,727	9,612	87,410	56,797

TABLE E-30. ESTIMATED ANNUAL F/A-18E/F FLIGHT ACTIVITY

F/A-18E/F SQUADRONS	FLIGHT EVENT	ANNUAL FLIGHT OPERATIONS DAYTIME	EVENING	NIGHT	TOTAL	TOTAL EVENTS
COMBINED	Takeoff	15,392	2,826	538	18,756	18,756
E/F	Landing	11,785	2,013	1,497	15,295	15,295
SQUADRONS	Overhead Break Landing	2,455	663	343	3,461	3,461
(PHASE 2)	Touch-and-Go Pattern	24,109	3,096	2,361	29,566	14,783
[164 ACFT]	FCLP Pattern	19,787	12,209	6,872	38,868	19,434
	GCA Box Pattern	3,936	1,826	676	6,438	3,219
	ACLS Pattern	152	610	340	1,102	551
	TOTALS	77,616	23,243	12,627	113,486	75,499

Notes: FCLP = Field Carrier Landing Practice pattern
GCA = Ground Controlled Approach pattern
ACLS = Automated Carrier Landing System pattern (similar to GCA)
Takeoffs and landings are each considered one flight operation.
Pattern events are considered two flight operations (an approach and a climbout).
Overhead break landings are a flyover of the airfield followed by loop back into the approach pattern for the actual landing.
Flight operations data are taken from the "Scenario 1 Basic Operations" table in ATAC Corporation (1997) [Table A-2 in the ATAC report].
Combined visual and instrument landings as listed in Table A-2 of the ATAC (1997) report have been partitioned into overhead break and straight-in landings using percentage factors derived from Table A-5 of that report. Day, evening, and night overhead break percentages for fleet squadrons: 83.7%, 83.8%, and 86.0%. Day, evening, and night overhead break percentages for the FRS squadron: 81.7%, 64.7%, and 77.0%.
Touch-and-go patterns are labeled as visual touch-and-go/low approach in the ATAC (1997) data table.
GCA box patterns are labeled as instrument touch-and-go/low approach in the ATAC (1997) data table.

Data Source: ATAC Corporation, 1997. NAS Lemoore F/A-18E/F Fleet Introduction and E-2 Realignment Airfield and Airspace Operational Study. Draft Report.

TABLE E-31. ESTIMATED ANNUAL F/A-18C/D FLIGHT ACTIVITY

F/A-18C/D SQUADRONS	FLIGHT EVENT	ANNUAL FLIGHT OPERATIONS DAYTIME	EVENING	NIGHT	TOTAL	TOTAL EVENTS
C/D FLEET (PHASE 1) [120 ACFT]	Takeoff	9,594	1,826	363	11,783	11,783
	Overhead Break Landing	7,775	1,426	949	10,150	10,150
	Straight-In Landing	1,243	292	98	1,633	1,633
	Touch-and-Go Pattern	4,568	326	144	5,038	2,519
	FCLP Pattern	10,422	6,512	4,270	21,204	10,602
	GCA Box Pattern	1,076	342	120	1,538	769
	ACLS Pattern	24	172	172	368	184
	SUBTOTAL	34,702	10,896	6,116	51,714	37,640
C/D FLEET (PHASE 2) [48 ACFT]	Takeoff	3,838	730	145	4,713	4,713
	Overhead Break Landing	3,110	570	380	4,060	4,060
	Straight-In Landing	497	117	39	653	653
	Touch-and-Go Pattern	1,827	130	57	2,014	1,007
	FCLP Pattern	4,169	2,605	1,708	8,482	4,241
	GCA Box Pattern	431	137	48	616	308
	ACLS Pattern	10	69	69	148	74
	SUBTOTAL	13,882	4,358	2,446	20,686	15,056
C/D FRS (PHASE 1) [36 ACFT]	Takeoff	6,824	1,155	135	8,114	8,114
	Overhead Break Landing	5,360	581	341	6,282	6,282
	Straight-In Landing	1,048	575	209	1,832	1,832
	Touch-and-Go Pattern	14,922	1,254	648	16,824	8,412
	FCLP Pattern	12,478	8,362	2,280	23,120	11,560
	GCA Box Pattern	2,384	1,526	502	4,412	2,206
	ACLS Pattern	52	456	128	636	318
	SUBTOTAL	43,068	13,909	4,243	61,220	38,724
C/D FRS (PHASE 2) [10 ACFT]	Takeoff	1,896	321	38	2,255	2,255
	Overhead Break Landing	1,489	162	95	1,746	1,746
	Straight-In Landing	291	160	58	509	509
	Touch-and-Go Pattern	4,144	348	180	4,672	2,336
	FCLP Pattern	3,466	2,323	633	6,422	3,211
	GCA Box Pattern	662	424	140	1,226	613
	ACLS Pattern	14	127	35	176	88
	SUBTOTAL	11,962	3,865	1,179	17,006	10,758

TABLE E-31. ESTIMATED ANNUAL F/A-18C/D FLIGHT ACTIVITY

F/A-18C/D SQUADRONS	FLIGHT EVENT	ANNUAL FLIGHT OPERATIONS DAYTIME	EVENING	NIGHT	TOTAL	TOTAL EVENTS
COMBINED	Takeoff	16,418	2,981	498	19,897	19,897
C/D	Landing	13,135	2,007	1,290	16,432	16,432
SQUADRONS	Overhead Break Landing	2,291	867	307	3,465	3,465
(PHASE 1)	Touch-and-Go Pattern	19,490	1,580	792	21,862	10,931
[156 ACFT]	FCLP Pattern	22,900	14,874	6,550	44,324	22,162
	GCA Box Pattern	3,460	1,868	622	5,950	2,975
	ACLS Pattern	76	628	300	1,004	502
	TOTALS	77,770	24,805	10,359	112,934	76,364
COMBINED	Takeoff	5,734	1,051	183	6,968	6,968
C/D	Landing	4,599	732	475	5,806	5,806
SQUADRONS	Overhead Break Landing	788	277	97	1,162	1,162
(PHASE 2)	Touch-and-Go Pattern	5,971	478	237	6,686	3,343
[58 ACFT]	FCLP Pattern	7,635	4,928	2,341	14,904	7,452
	GCA Box Pattern	1,093	561	188	1,842	921
	ACLS Pattern	24	196	104	324	162
	TOTALS	25,844	8,223	3,625	37,692	25,814

Notes: FCLP = Field Carrier Landing Practice pattern
GCA = Ground Controlled Approach pattern
ACLS = Automated Carrier Landing System pattern (similar to GCA)
Takeoffs and landings are each considered one flight operation.
Pattern events are considered two flight operations (an approach and a climbout).
Overhead break landings are a flyover of the airfield followed by loop back into the approach pattern for the actual landing.
Flight operations data are taken from the "Scenario 1 Basic Operations" table in ATAC Corporation (1997) [Table A-2 in the ATAC report].
Flight operation estimates for end of Phase 2 conditions (2010) are extrapolated from Phase 1 estimates according to the change in the number of aircraft in FRS and fleet squadrons (FRS squadron reduced from 36 to 10 aircraft; fleet squadrons reduced from 120 to 48 aircraft).
Combined visual and instrument landings as listed in Table A-2 of the ATAC (1997) report have been partitioned into overhead break and straight-in landings using percentage factors derived from Table A-5 of that report. Day, evening, and night overhead break percentages for fleet squadrons: 86.2%, 83.0%, and 90.6%. Day, evening, and night overhead break percentages for the FRS squadron: 83.6%, 50.3%, and 62.0%.
Touch-and-go patterns are labeled as visual touch-and-go/low approach in the ATAC (1997) data table.
GCA box patterns are labeled as instrument touch-and-go/low approach in the ATAC (1997) data table.

TABLE E-31. ESTIMATED ANNUAL F/A-18C/D FLIGHT ACTIVITY

Data Source: ATAC Corporation, 1997. NAS Lemoore F/A-18E/F Fleet Introduction and E-2 Realignment Airfield and Airspace Operational Study. Draft Report.

TABLE E-32. PHASING OF F/A-18E/F AIRCRAFT ARRIVALS AND F/A-18C/D AIRCRAFT REMOVALS, NAS LEMOORE ALTERNATIVE

			F/A-18E/F AIRCRAFT ARRIVALS				CUMULATIVE ADDITIONS	
YEAR	F/A-18E/F SQUADRONS IN PLACE	PHASE	E/F FRS ARRIVAL	FLEET ARRIVAL	E/F FRS TOTAL	FLEET TOTAL	ANNUAL SORTIES	ANNUAL OPERATIONS
2000	PARTIAL FRS + 1 FLEET SQUADRON	PHASE 1	20	14	20	14	5,927	42,364
2001	FULL FRS + 2 FLEET SQUADRONS	PHASE 1	16	14	36	28	10,890	77,269
2002	FULL FRS + 3 FLEET SQUADRONS	PHASE 1		14	36	42	11,991	82,340
2003	FULL FRS + 4 FLEET SQUADRONS	PHASE 1		14	36	56	13,092	87,410
2004	FULL FRS + 4 FLEET SQUADRONS	PHASE 1			36	56	13,092	87,410
2005	FULL FRS + 5 FLEET SQUADRONS	PHASE 2		12	36	68	14,036	91,756
2006	FULL FRS + 6 FLEET SQUADRONS	PHASE 2		12	36	80	14,980	96,102
2007	FULL FRS + 7 FLEET SQUADRONS	PHASE 2		12	36	92	15,924	100,448
2008	FULL FRS + 8 FLEET SQUADRONS	PHASE 2		12	36	104	16,868	104,794
2009	FULL FRS + 9 FLEET SQUADRONS	PHASE 2		12	36	116	17,812	109,140
2010	FULL FRS + 10 FLEET SQUADRONS	PHASE 2		12	36	128	18,756	113,486

			F/A-18C/D AIRCRAFT REMOVALS				CUMULATIVE REDUCTIONS	
YEAR	CUMULATIVE F/A-18C/D AIRCRAFT REMOVALS	PHASE	C/D FRS REMOVAL	FLEET REMOVAL	C/D FRS TOTAL	FLEET TOTAL	ANNUAL SORTIES	ANNUAL OPERATIONS
2005	1 FLEET SQUADRON, 4 FRS AIRCRAFT	PHASE 2	4	12	4	12	2,080	8,066
2006	2 FLEET SQUADRONS, 8 FRS AIRCRAFT	PHASE 2	4	12	8	24	4,159	16,133
2007	3 FLEET SQUADRONS, 12 FRS AIRCRAFT	PHASE 2	4	12	12	36	6,239	24,199
2008	4 FLEET SQUADRONS, 16 FRS AIRCRAFT	PHASE 2	4	12	16	48	8,319	32,266
2009	5 FLEET SQUADRONS, 21 FRS AIRCRAFT	PHASE 2	5	12	21	60	10,624	41,408
2010	6 FLEET SQUADRONS, 26 FRS AIRCRAFT	PHASE 2	5	12	26	72	12,929	50,550

Notes: Estimated annual sorties and operations are extrapolated from data in Tables E-30 and E-31.

TABLE E-33. PHASING OF F/A-18E/F AIRCRAFT ARRIVALS AND ADDED FLIGHT OPERATIONS, NAF EL CENTRO ALTERNATIVE

			F/A-18E/F AIRCRAFT ARRIVALS				CUMULATIVE ADDITIONS	
YEAR	F/A-18E/F SQUADRONS IN PLACE	PHASE	E/F FRS ARRIVAL	FLEET ARRIVAL	E/F FRS TOTAL	FLEET TOTAL	ANNUAL SORTIES	ANNUAL OPERATIONS
2000	PARTIAL FRS + 1 FLEET SQUADRON	PHASE 1	20	14	20	14	5,927	42,364
2001	FULL FRS + 2 FLEET SQUADRONS	PHASE 1	16	14	36	28	10,890	77,269
2002	FULL FRS + 3 FLEET SQUADRONS	PHASE 1		14	36	42	11,991	82,340
2003	FULL FRS + 4 FLEET SQUADRONS	PHASE 1		14	36	56	13,092	87,410
2004	FULL FRS + 4 FLEET SQUADRONS	PHASE 1			36	56	13,092	87,410
2005	FULL FRS + 5 FLEET SQUADRONS	PHASE 2		12	36	68	14,036	91,756
2006	FULL FRS + 6 FLEET SQUADRONS	PHASE 2		12	36	80	14,980	96,102
2007	FULL FRS + 7 FLEET SQUADRONS	PHASE 2		12	36	92	15,924	100,448
2008	FULL FRS + 8 FLEET SQUADRONS	PHASE 2		12	36	104	16,868	104,794
2009	FULL FRS + 9 FLEET SQUADRONS	PHASE 2		12	36	116	17,812	109,140
2010	FULL FRS + 10 FLEET SQUADRONS	PHASE 2		12	36	128	18,756	113,486

Notes: Estimated annual sorties and operations are extrapolated from data in Table E-30.

TABLE E-34. DATA USED TO ESTIMATE EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	51,714	Departure	22.78%	APU Use	On	11,783	34.4	25.9	2.5	197	0.25	6.25	2.00	0.40	0.22
(EXISTING		GTC 36-200			22.78%	Checks	G Idle	11,783	34.4	25.9	12.0	624	58.18	1.16	137.34	0.40	13.50
C/D FLEET					22.78%	Taxi Out	G Idle	11,783	34.4	25.9	5.9	624	58.18	1.16	137.34	0.40	13.50
SQUADRONS)					22.78%	AB Takeoff	Max AB	11,783	34.4	25.9	0.4	28,397	0.13	9.22	23.12	0.40	no data
[120 ACFT]					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	8,587	0.31	25.16	1.05	0.40	2.81
					22.78%	Climbout	IRP	11,783	34.4	25.9	0.7	8,587	0.31	25.16	1.05	0.40	2.81
				Arrival	3.16%	Straight In	85% rpm	1,633	4.8	3.6	1.6	2,595	0.54	5.45	4.43	0.40	7.62
					19.63%	Overhead In	85% rpm	10,150	29.6	22.3	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					22.78%	Taxi In	G Idle	11,783	34.4	25.9	5.9	624	58.18	1.16	137.34	0.40	13.50
					18.23%	Hot Refuel	G Idle	9,426	27.5	20.7	11.0	624	58.18	1.16	137.34	0.40	13.50
				Touch-and-Go	4.87%	Approach	85% rpm	2,519	7.4	5.5	1.5	2,595	0.54	5.45	4.43	0.40	7.62
					4.87%	Climbout	IRP	2,519	7.4	5.5	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					4.87%	Circle	85% rpm	2,519	7.4	5.5	1.5	2,595	0.54	5.45	4.43	0.40	7.62
				FCLP	20.50%	Approach	85% rpm	10,602	31.0	23.3	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					20.50%	Climbout	IRP	10,602	31.0	23.3	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					20.50%	Circle	85% rpm	10,602	31.0	23.3	3.0	2,595	0.54	5.45	4.43	0.40	7.62
				GCA Box	1.49%	Approach	85% rpm	769	2.2	1.7	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					1.49%	Climbout	IRP	769	2.2	1.7	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					1.49%	Circle	85% rpm	769	2.2	1.7	4.0	2,595	0.54	5.45	4.43	0.40	7.62
				ACLS	0.36%	Approach	85% rpm	184	0.5	0.4	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					0.36%	Climbout	IRP	184	0.5	0.4	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					0.36%	Circle	85% rpm	184	0.5	0.4	4.0	2,595	0.54	5.45	4.43	0.40	7.62
Existing C/D fleet squadrons, subtotal below 3,000 feet					100.0%			51,714	151.0	113.7							

TABLE E-34. DATA USED TO ESTIMATE EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	61,220	Departure	13.25%	APU Use	On	8,114	23.7	17.8	2.5	197	0.25	6.25	2.00	0.40	0.22
(EXISTING		GTC 36-200			13.25%	Checks	G Idle	8,114	23.7	17.8	12.0	624	58.18	1.16	137.34	0.40	13.50
C/D FRS					13.25%	Taxi Out	G Idle	8,114	23.7	17.8	5.9	624	58.18	1.16	137.34	0.40	13.50
AIRCRAFT)					13.25%	AB Takeoff	Max AB	8,114	23.7	17.8	0.4	28,397	0.13	9.22	23.12	0.40	no data
[36 ACFT]					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	8,587	0.31	25.16	1.05	0.40	2.81
					13.25%	Climbout	IRP	8,114	23.7	17.8	0.7	8,587	0.31	25.16	1.05	0.40	2.81
				Arrival	2.99%	Straight In	85% rpm	1,832	5.3	4.0	1.6	2,595	0.54	5.45	4.43	0.40	7.62
					10.26%	Overhead In	85% rpm	6,282	18.3	13.8	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					13.25%	Taxi In	G Idle	8,114	23.7	17.8	5.9	624	58.18	1.16	137.34	0.40	13.50
					10.60%	Hot Refuel	G Idle	6,491	19.0	14.3	11.0	624	58.18	1.16	137.34	0.40	13.50
				Touch-and-Go	13.74%	Approach	85% rpm	8,412	24.6	18.5	1.5	2,595	0.54	5.45	4.43	0.40	7.62
					13.74%	Climbout	IRP	8,412	24.6	18.5	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					13.74%	Circle	85% rpm	8,412	24.6	18.5	1.5	2,595	0.54	5.45	4.43	0.40	7.62
				FCLP	18.88%	Approach	85% rpm	11,560	33.8	25.4	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					18.88%	Climbout	IRP	11,560	33.8	25.4	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					18.88%	Circle	85% rpm	11,560	33.8	25.4	3.0	2,595	0.54	5.45	4.43	0.40	7.62
				GCA Box	3.60%	Approach	85% rpm	2,206	6.4	4.8	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					3.60%	Climbout	IRP	2,206	6.4	4.8	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					3.60%	Circle	85% rpm	2,206	6.4	4.8	4.0	2,595	0.54	5.45	4.43	0.40	7.62
				ACLS	0.52%	Approach	85% rpm	318	0.9	0.7	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					0.52%	Climbout	IRP	318	0.9	0.7	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					0.52%	Circle	85% rpm	318	0.9	0.7	4.0	2,595	0.54	5.45	4.43	0.40	7.62
Existing C/D FRS aircraft, subtotal below 3,000 feet					100.0%			61,220	178.7	134.5							

TABLE E-34. DATA USED TO ESTIMATE EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	112,934	Departure	17.62%	APU Use	On	19,897	58.1	43.7	2.5	197	0.25	6.25	2.00	0.40	0.22
(EXISTING		GTC 36-200			17.62%	Checks	G Idle	19,897	58.1	43.7	12.0	749	54.20	3.29	88.85	0.40	12.75
AIRCRAFT)					17.62%	Taxi Out	G Idle	19,897	58.1	43.7	5.9	749	54.20	3.29	88.85	0.40	12.75
[156 ACFT]					17.62%	AB Takeoff	Max AB	19,897	58.1	43.7	0.4	35,603	4.72	9.47	262.12	0.40	no data
					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
					17.62%	Climbout	IRP	19,897	58.1	43.7	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	3.07%	Straight In	85% rpm	3,465	10.1	7.6	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					14.55%	Overhead In	85% rpm	16,432	48.0	36.1	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					17.62%	Taxi In	G Idle	19,897	58.1	43.7	5.9	749	54.20	3.29	88.85	0.40	12.75
					14.09%	Hot Refuel	G Idle	15,917	46.5	35.0	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	9.68%	Approach	85% rpm	10,931	31.9	24.0	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					9.68%	Climbout	IRP	10,931	31.9	24.0	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					9.68%	Circle	85% rpm	10,931	31.9	24.0	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	19.62%	Approach	85% rpm	22,162	64.7	48.7	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					19.62%	Climbout	IRP	22,162	64.7	48.7	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					19.62%	Circle	85% rpm	22,162	64.7	48.7	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	2.63%	Approach	85% rpm	2,975	8.7	6.5	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					2.63%	Climbout	IRP	2,975	8.7	6.5	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					2.63%	Circle	85% rpm	2,975	8.7	6.5	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.44%	Approach	85% rpm	502	1.5	1.1	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.44%	Climbout	IRP	502	1.5	1.1	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.44%	Circle	85% rpm	502	1.5	1.1	4.0	3,357	0.13	9.71	1.40	0.40	6.55
Post-Phase 2 F/A-18C/D aircraft, below 3,000 feet					100.00%			112,934	329.7	248.2							

TABLE E-34. DATA USED TO ESTIMATE EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE ALTERNATIVE

Notes:

APU = auxiliary power unit (starts aircraft engines and provides electrical power and air conditioning prior to start of main engines)
Checks = preflight engine and component checks
FLCP = field carrier landing practice
GCA = ground controlled approach
ACLS = automated carrier landing system
G Idle = ground idle
AB = afterburner
IRP = intermediate rated power (equivalent to military power setting)

Annual flight operation estimates for existing F/A-18C/D aircraft based on naval aviation simulation model (NASMOD) data (ATAC Corporation 1997); see table E-31.
Departures and arrivals each represent a single flight operation; pattern events (T&G, FCLP, GCA box, ACLS) each represent two flight operations (an approach and a climbout).
Flight operation totals and subtotals are the sum of approach mode and climbout mode numbers.
Time-in-mode estimates for F/A-18 operations below 3,000 feet based on Thompson (1997) and U.S. Environmental Protection Agency (1985; 1992).
Engine power setting assumptions based on data from Navy Aircraft Environmental Support Office (AESO) personnel, NAS Lemoore personnel, and U.S. Environmental Protection Agency (1985; 1992).
F/A-18C/D takeoffs assume 100% maximum afterburner use for departures and no afterburner use for touch-and-go, FCLP, GCA, or ACLS patterns (per Lt. Thompson, E/F FIT).
F/A-18 aircraft taxi/idle data assume 100% ground idle conditions (per E/F FIT).
Emission rates for F/A-18C/D aircraft are based on data for the F404-GE-400 engine as presented in U.S. Navy (1990 and 1998).
No PM10 emission tests have been performed on F/A-18C/D aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
APU engine emission rates based on data for the GTC 36-200 engine (Coffer 1997), assuming maximum power output (per U.S. Environmental Protection Agency 1992).
APU engines shut off automatically 1 minute after start-up of the main aircraft engines (per Lt. Thompson, E/F FIT).
Hot refueling (refueling while engines are idling) assumed to occur for 80% of aircraft arrivals (per E/F FIT).
Sulfur oxide emission rates are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.
Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).
All values independently rounded for display after calculation.

Data Sources:

ATAC Corporation. 1997. NAS Lemoore F/A-18E/F Introduction and E-2 Realignment Airfield and Airspace Operational Study. Draft Report.
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U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes by Precentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A.).

TABLE E-35. ESTIMATED EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.1	1.8	0.6	0.1	0.1	0.1	1.3	0.4	0.1	0.0	0.01	0.30	0.10	0.02	0.01
(EXISTING		Checks	499.5	10.0	1,179.1	3.4	115.9	376.0	7.5	887.6	2.6	87.2	85.54	1.71	201.93	0.59	19.85
C/D FLEET		Taxi Out	245.6	4.9	579.7	1.7	57.0	184.9	3.7	436.4	1.3	42.9	42.06	0.84	99.28	0.29	9.76
SQUADRONS)		AB Takeoff	1.7	120.1	301.2	5.2	0.0	1.3	90.4	226.7	3.9	0.0	0.29	20.57	51.57	0.89	0.00
[120 ACFT]		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	2.1	173.4	7.2	2.8	19.4	1.6	130.5	5.4	2.1	14.6	0.37	29.70	1.24	0.47	3.32
	Arrival	Straight In	0.4	3.6	2.9	0.3	5.0	0.3	2.7	2.2	0.2	3.8	0.06	0.62	0.50	0.05	0.86
		Overhead In	4.0	40.5	32.9	3.0	56.6	3.0	30.5	24.8	2.2	42.6	0.69	6.94	5.64	0.51	9.70
		Taxi In	245.6	4.9	579.7	1.7	57.0	184.9	3.7	436.4	1.3	42.9	42.06	0.84	99.28	0.29	9.76
		Hot Refuel	366.3	7.3	864.7	2.5	85.0	275.7	5.5	650.9	1.9	64.0	62.73	1.25	148.07	0.43	14.56
	Touch-and-Go	Approach	0.5	5.2	4.2	0.4	7.3	0.4	3.9	3.2	0.3	5.5	0.09	0.89	0.72	0.07	1.25
		Climbout	0.2	15.9	0.7	0.3	1.8	0.1	12.0	0.5	0.2	1.3	0.03	2.72	0.11	0.04	0.30
		Circle	0.5	5.2	4.2	0.4	7.3	0.4	3.9	3.2	0.3	5.5	0.09	0.89	0.72	0.07	1.25
	FCLP	Approach	4.2	42.3	34.4	3.1	59.2	3.2	31.9	25.9	2.3	44.5	0.72	7.25	5.89	0.53	10.13
		Climbout	0.8	66.9	2.8	1.1	7.5	0.6	50.3	2.1	0.8	5.6	0.14	11.45	0.48	0.18	1.28
		Circle	4.3	43.8	35.6	3.2	61.2	3.3	33.0	26.8	2.4	46.1	0.74	7.50	6.09	0.55	10.48
	GCA Box	Approach	0.4	4.2	3.4	0.3	5.9	0.3	3.2	2.6	0.2	4.5	0.07	0.73	0.59	0.05	1.01
		Climbout	0.1	11.3	0.5	0.2	1.3	0.1	8.5	0.4	0.1	1.0	0.02	1.94	0.08	0.03	0.22
		Circle	0.4	4.2	3.4	0.3	5.9	0.3	3.2	2.6	0.2	4.5	0.07	0.73	0.59	0.05	1.01
	ACLS	Approach	0.1	1.0	0.8	0.1	1.4	0.1	0.8	0.6	0.1	1.1	0.02	0.17	0.14	0.01	0.24
		Climbout	0.0	2.7	0.1	0.0	0.3	0.0	2.0	0.1	0.0	0.2	0.01	0.46	0.02	0.01	0.05
		Circle	0.1	1.0	0.8	0.1	1.4	0.1	0.8	0.6	0.1	1.1	0.02	0.17	0.14	0.01	0.24
Exist. Fleet C/Ds below 3,000 ft			1,377.1	570.2	3,639.1	30.0	556.4	1,036.6	429.2	2,739.3	22.6	418.8	235.82	97.65	623.20	5.14	95.28

TABLE E-35. ESTIMATED EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.0	1.2	0.4	0.1	0.0	0.0	0.9	0.3	0.1	0.0	0.01	0.21	0.07	0.01	0.01
(EXISTING		Checks	344.0	6.9	812.0	2.4	79.8	258.9	5.2	611.2	1.8	60.1	58.91	1.17	139.05	0.40	13.67
C/D FRS		Taxi Out	169.1	3.4	399.2	1.2	39.2	127.3	2.5	300.5	0.9	29.5	28.96	0.58	68.37	0.20	6.72
AIRCRAFT)		AB Takeoff	1.2	82.7	207.4	3.6	0.0	0.9	62.3	156.1	2.7	0.0	0.20	14.16	35.51	0.61	0.00
[36 ACFT]		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	1.5	119.4	5.0	1.9	13.3	1.1	89.9	3.8	1.4	10.0	0.25	20.45	0.85	0.33	2.28
	Arrival	Straight In	0.4	4.0	3.3	0.3	5.6	0.3	3.0	2.5	0.2	4.2	0.07	0.69	0.56	0.05	0.97
		Overhead In	2.5	25.1	20.4	1.8	35.1	1.9	18.9	15.3	1.4	26.4	0.43	4.29	3.49	0.32	6.00
		Taxi In	169.1	3.4	399.2	1.2	39.2	127.3	2.5	300.5	0.9	29.5	28.96	0.58	68.37	0.20	6.72
		Hot Refuel	252.2	5.0	595.4	1.7	58.5	189.9	3.8	448.2	1.3	44.1	43.20	0.86	101.97	0.30	10.02
	Touch-and-Go	Approach	1.7	17.4	14.1	1.3	24.3	1.3	13.1	10.6	1.0	18.3	0.29	2.97	2.42	0.22	4.16
		Climbout	0.7	53.1	2.2	0.8	5.9	0.5	39.9	1.7	0.6	4.5	0.11	9.09	0.38	0.14	1.01
		Circle	1.7	17.4	14.1	1.3	24.3	1.3	13.1	10.6	1.0	18.3	0.29	2.97	2.42	0.22	4.16
	FCLP	Approach	4.6	46.1	37.5	3.4	64.5	3.4	34.7	28.2	2.5	48.6	0.78	7.90	6.42	0.58	11.05
		Climbout	0.9	72.9	3.0	1.2	8.1	0.7	54.9	2.3	0.9	6.1	0.15	12.49	0.52	0.20	1.39
		Circle	4.7	47.7	38.8	3.5	66.7	3.6	35.9	29.2	2.6	50.2	0.81	8.17	6.64	0.60	11.43
	GCA Box	Approach	1.2	12.1	9.9	0.9	17.0	0.9	9.1	7.4	0.7	12.8	0.21	2.08	1.69	0.15	2.91
		Climbout	0.4	32.5	1.4	0.5	3.6	0.3	24.4	1.0	0.4	2.7	0.07	5.56	0.23	0.09	0.62
		Circle	1.2	12.1	9.9	0.9	17.0	0.9	9.1	7.4	0.7	12.8	0.21	2.08	1.69	0.15	2.91
	ACLS	Approach	0.2	1.8	1.4	0.1	2.4	0.1	1.3	1.1	0.1	1.8	0.03	0.30	0.24	0.02	0.42
		Climbout	0.1	4.7	0.2	0.1	0.5	0.0	3.5	0.1	0.1	0.4	0.01	0.80	0.03	0.01	0.09
		Circle	0.2	1.8	1.4	0.1	2.4	0.1	1.3	1.1	0.1	1.8	0.03	0.30	0.24	0.02	0.42
Existing C/D FRS below 3,000 ft			957.5	570.6	2,576.2	28.2	507.8	720.8	429.5	1,939.2	21.2	382.3	163.98	97.72	441.18	4.83	86.96

TABLE E-35. ESTIMATED EMISSIONS FROM 1997 BASELINE F/A-18C/D AIR OPERATIONS AT NAS LEMOORE

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Average Daily Winter Emissions (pounds/day) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Total Emissions from Annual Flight Operations (tons/year) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.1	3.0	1.0	0.2	0.1	0.1	2.2	0.7	0.1	0.1	0.02	0.51	0.16	0.03	0.02
(EXISTING		Checks	843.5	16.8	1,991.1	5.8	195.7	634.9	12.7	1,498.8	4.4	147.3	144.45	2.88	340.98	0.99	33.52
AIRCRAFT)		Taxi Out	414.7	8.3	979.0	2.9	96.2	312.2	6.2	736.9	2.1	72.4	71.02	1.42	167.65	0.49	16.48
[156 ACFT]		AB Takeoff	2.9	202.8	508.5	8.8	0.0	2.2	152.7	382.8	6.6	0.0	0.49	34.73	87.09	1.51	0.00
		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	3.6	292.9	12.2	4.7	32.7	2.7	220.4	9.2	3.5	24.6	0.62	50.15	2.09	0.80	5.60
	Arrival	Straight In	0.8	7.6	6.2	0.6	10.7	0.6	5.7	4.7	0.4	8.0	0.13	1.31	1.06	0.10	1.83
		Overhead In	6.5	65.6	53.3	4.8	91.7	4.9	49.4	40.1	3.6	69.0	1.11	11.23	9.13	0.82	15.70
		Taxi In	414.7	8.3	979.0	2.9	96.2	312.2	6.2	736.9	2.1	72.4	71.02	1.42	167.65	0.49	16.48
		Hot Refuel	618.5	12.3	1,460.1	4.3	143.5	465.6	9.3	1,099.1	3.2	108.0	105.92	2.11	250.04	0.73	24.58
	Touch-and-Go	Approach	2.2	22.6	18.3	1.7	31.6	1.7	17.0	13.8	1.2	23.8	0.38	3.86	3.14	0.28	5.40
		Climbout	0.8	69.0	2.9	1.1	7.7	0.6	51.9	2.2	0.8	5.8	0.15	11.81	0.49	0.19	1.32
		Circle	2.2	22.6	18.3	1.7	31.6	1.7	17.0	13.8	1.2	23.8	0.38	3.86	3.14	0.28	5.40
	FCLP	Approach	8.8	88.5	71.9	6.5	123.7	6.6	66.6	54.1	4.9	93.1	1.50	15.15	12.31	1.11	21.18
		Climbout	1.7	139.8	5.8	2.2	15.6	1.3	105.2	4.4	1.7	11.8	0.29	23.94	1.00	0.38	2.67
		Circle	9.1	91.5	74.4	6.7	128.0	6.8	68.9	56.0	5.1	96.3	1.55	15.67	12.74	1.15	21.91
	GCA Box	Approach	1.6	16.4	13.3	1.2	22.9	1.2	12.3	10.0	0.9	17.2	0.28	2.80	2.28	0.21	3.92
		Climbout	0.5	43.8	1.8	0.7	4.9	0.4	33.0	1.4	0.5	3.7	0.09	7.50	0.31	0.12	0.84
		Circle	1.6	16.4	13.3	1.2	22.9	1.2	12.3	10.0	0.9	17.2	0.28	2.80	2.28	0.21	3.92
	ACLS	Approach	0.3	2.8	2.2	0.2	3.9	0.2	2.1	1.7	0.2	2.9	0.05	0.47	0.38	0.03	0.66
		Climbout	0.1	7.4	0.3	0.1	0.8	0.1	5.6	0.2	0.1	0.6	0.02	1.27	0.05	0.02	0.14
		Circle	0.3	2.8	2.2	0.2	3.9	0.2	2.1	1.7	0.2	2.9	0.05	0.47	0.38	0.03	0.66
Remaining C/D acft below 3,000 ft			2,334.6	1,140.9	6,215.3	58.2	1,064.2	1,757.3	858.8	4,678.6	43.8	801.1	399.80	195.37	1,064.38	9.97	182.24

Notes:

APU = auxiliary power unit (starts aircraft engines and provides electrical power and air conditioning prior to start of main engines)

Checks = preflight engine and component checks

FLCP = field carrier landing practice

GCA = ground controlled approach

ACLS = automated carrier landing system

G Idle = ground idle

AB = afterburner

IRP = intermediate rated power (equivalent to military power setting)

Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).

Flight activity and emission rate assumptions are presented in Table E-34.

All values independently rounded for display after calculation.

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TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations Spring - Fall	Average Daily Flight Operations Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
													Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
F/A-18E/F	2	F414-GE-400	67,128	Departure	12.94%	APU Use	On	8,687	25.4	19.1	2.5	197	0.25	6.25	2.00	0.40	0.22
(FRS)		F404-GE-400			12.94%	Checks	G Idle	8,687	25.4	19.1	12.0	749	54.20	3.29	88.85	0.40	12.75
[36 ACFT]		GTC 36-200			12.94%	Taxi Out	G Idle	8,687	25.4	19.1	5.9	749	54.20	3.29	88.85	0.40	12.75
					12.94%	AB Takeoff	Max AB	8,687	25.4	19.1	0.4	35,603	4.72	9.47	262.12	0.40	no data
					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
					12.94%	Climbout	IRP	8,687	25.4	19.1	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	2.74%	Straight In	85% rpm	1,840	5.4	4.0	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					10.20%	Overhead In	85% rpm	6,847	20.0	15.0	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					12.94%	Taxi In	G Idle	8,687	25.4	19.1	5.9	749	54.20	3.29	88.85	0.40	12.75
					10.35%	Hot Refuel	G Idle	6,950	20.3	15.3	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	18.87%	Approach	85% rpm	12,664	37.0	27.8	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					18.87%	Climbout	IRP	12,664	37.0	27.8	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					18.87%	Circle	85% rpm	12,664	37.0	27.8	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	13.96%	Approach	85% rpm	9,368	27.4	20.6	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					13.96%	Climbout	IRP	9,368	27.4	20.6	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					13.96%	Circle	85% rpm	9,368	27.4	20.6	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	3.69%	Approach	85% rpm	2,476	7.2	5.4	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					3.69%	Climbout	IRP	2,476	7.2	5.4	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					3.69%	Circle	85% rpm	2,476	7.2	5.4	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.55%	Approach	85% rpm	369	1.1	0.8	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.55%	Climbout	IRP	369	1.1	0.8	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.55%	Circle	85% rpm	369	1.1	0.8	4.0	3,357	0.13	9.71	1.40	0.40	6.55
FRS squadron subtotal below 3,000 feet					100.00%			67,128	196.0	147.5							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	2	F414-GE-400	20,282	Departure	21.72%	APU Use	On	4,405	12.9	9.7	2.5	197	0.25	6.25	2.00	0.40	0.22
(FLEET..		F404-GE-400			21.72%	Checks	G Idle	4,405	12.9	9.7	12.0	749	54.20	3.29	88.85	0.40	12.75
PHASE 1)		GTC 36-200			21.72%	Taxi Out	G Idle	4,405	12.9	9.7	5.9	749	54.20	3.29	88.85	0.40	12.75
[56 ACFT]					21.72%	AB Takeoff	Max AB	4,405	12.9	9.7	0.4	35,603	4.72	9.47	262.12	0.40	no data
					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
					21.72%	Climbout	IRP	4,405	12.9	9.7	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	3.50%	Straight In	85% rpm	709	2.1	1.6	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					18.22%	Overhead In	85% rpm	3,696	10.8	8.1	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					21.72%	Taxi In	G Idle	4,405	12.9	9.7	5.9	749	54.20	3.29	88.85	0.40	12.75
					17.38%	Hot Refuel	G Idle	3,524	10.3	7.7	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	4.57%	Approach	85% rpm	927	2.7	2.0	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					4.57%	Climbout	IRP	927	2.7	2.0	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					4.57%	Circle	85% rpm	927	2.7	2.0	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	21.71%	Approach	85% rpm	4,404	12.9	9.7	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					21.71%	Climbout	IRP	4,404	12.9	9.7	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					21.71%	Circle	85% rpm	4,404	12.9	9.7	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	1.60%	Approach	85% rpm	325	0.9	0.7	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					1.60%	Climbout	IRP	325	0.9	0.7	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					1.60%	Circle	85% rpm	325	0.9	0.7	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.39%	Approach	85% rpm	80	0.2	0.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.39%	Climbout	IRP	80	0.2	0.2	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.39%	Circle	85% rpm	80	0.2	0.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
Phase 1 fleet squadrons subtotal below 3,000 feet					100.0%			20,282	59.2	44.6							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	2	F414-GE-400	26,076	Departure	21.72%	APU Use	On	5,664	16.5	12.4	2.5	197	0.25	6.25	2.00	0.40	0.22
(FLEET,		F404-GE-400			21.72%	Checks	G Idle	5,664	16.5	12.4	12.0	749	54.20	3.29	88.85	0.40	12.75
PHASE 2)		GTC 36-200			21.72%	Taxi Out	G Idle	5,664	16.5	12.4	5.9	749	54.20	3.29	88.85	0.40	12.75
[72 ACFT]					21.72%	AB Takeoff	Max AB	5,664	16.5	12.4	0.4	35,603	4.72	9.47	262.12	0.40	no data
					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
					21.72%	Climbout	IRP	5,664	16.5	12.4	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	3.50%	Straight In	85% rpm	912	2.7	2.0	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					18.22%	Overhead In	85% rpm	4,752	13.9	10.4	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					21.72%	Taxi In	G Idle	5,664	16.5	12.4	5.9	749	54.20	3.29	88.85	0.40	12.75
					17.38%	Hot Refuel	G Idle	4,531	13.2	10.0	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	4.57%	Approach	85% rpm	1,192	3.5	2.6	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					4.57%	Climbout	IRP	1,192	3.5	2.6	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					4.57%	Circle	85% rpm	1,192	3.5	2.6	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	21.71%	Approach	85% rpm	5,662	16.5	12.4	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					21.71%	Climbout	IRP	5,662	16.5	12.4	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					21.71%	Circle	85% rpm	5,662	16.5	12.4	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	1.60%	Approach	85% rpm	418	1.2	0.9	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					1.60%	Climbout	IRP	418	1.2	0.9	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					1.60%	Circle	85% rpm	418	1.2	0.9	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.39%	Approach	85% rpm	102	0.3	0.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.39%	Climbout	IRP	102	0.3	0.2	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.39%	Circle	85% rpm	102	0.3	0.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
Phase 2 fleet squadrons subtotal below 3,000 feet					100.0%			26,076	76.1	57.3							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	31,028	Departure	22.79%	APU Use	On	7,070	20.6	15.5	2.5	197	0.25	6.25	2.00	0.40	0.22
(REPLACED		GTC 36-200			22.79%	Checks	G Idle	7,070	20.6	15.5	12.0	624	58.18	1.16	137.34	0.40	13.50
FLEET					22.79%	Taxi Out	G Idle	7,070	20.6	15.5	5.9	624	58.18	1.16	137.34	0.40	13.50
SQUADRONS,					22.79%	AB Takeoff	Max AB	7,070	20.6	15.5	0.4	28,397	0.13	9.22	23.12	0.40	no data
PHASE 2)					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	8,587	0.31	25.16	1.05	0.40	2.81
[72 ACFT]					22.79%	Climbout	IRP	7,070	20.6	15.5	0.7	8,587	0.31	25.16	1.05	0.40	2.81
				Arrival	3.16%	Straight In	85% rpm	980	2.9	2.2	1.6	2,595	0.54	5.45	4.43	0.40	7.62
					19.63%	Overhead In	85% rpm	6,090	17.8	13.4	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					22.79%	Taxi In	G Idle	7,070	20.6	15.5	5.9	624	58.18	1.16	137.34	0.40	13.50
					18.23%	Hot Refuel	G Idle	5,656	16.5	12.4	11.0	624	58.18	1.16	137.34	0.40	13.50
				Touch-and-Go	4.87%	Approach	85% rpm	1,512	4.4	3.3	1.5	2,595	0.54	5.45	4.43	0.40	7.62
					4.87%	Climbout	IRP	1,512	4.4	3.3	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					4.87%	Circle	85% rpm	1,512	4.4	3.3	1.5	2,595	0.54	5.45	4.43	0.40	7.62
				FCLP	20.50%	Approach	85% rpm	6,361	18.6	14.0	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					20.50%	Climbout	IRP	6,361	18.6	14.0	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					20.50%	Circle	85% rpm	6,361	18.6	14.0	3.0	2,595	0.54	5.45	4.43	0.40	7.62
				GCA Box	1.49%	Approach	85% rpm	461	1.3	1.0	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					1.49%	Climbout	IRP	461	1.3	1.0	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					1.49%	Circle	85% rpm	461	1.3	1.0	4.0	2,595	0.54	5.45	4.43	0.40	7.62
				ACLS	0.35%	Approach	85% rpm	110	0.3	0.2	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					0.35%	Climbout	IRP	110	0.3	0.2	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					0.35%	Circle	85% rpm	110	0.3	0.2	4.0	2,595	0.54	5.45	4.43	0.40	7.62
Replaced C/D fleet squadrons, subtotal below 3,000 feet					100.0%			31,028	90.6	68.2							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations Spring - Fall	Average Daily Flight Operations Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	44,214	Departure	13.25%	APU Use	On	5,859	17.1	12.9	2.5	197	0.25	6.25	2.00	0.40	0.22
(ELIMINATED		GTC 36-200			13.25%	Checks	G Idle	5,859	17.1	12.9	12.0	624	58.18	1.16	137.34	0.40	13.50
C/D FRS					13.25%	Taxi Out	G Idle	5,859	17.1	12.9	5.9	624	58.18	1.16	137.34	0.40	13.50
AIRCRAFT,					13.25%	AB Takeoff	Max AB	5,859	17.1	12.9	0.4	28,397	0.13	9.22	23.12	0.40	no data
PHASE 2)					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	8,587	0.31	25.16	1.05	0.40	2.81
[26 ACFT]					13.25%	Climbout	IRP	5,859	17.1	12.9	0.7	8,587	0.31	25.16	1.05	0.40	2.81
				Arrival	2.99%	Straight In	85% rpm	1,323	3.9	2.9	1.6	2,595	0.54	5.45	4.43	0.40	7.62
					10.26%	Overhead In	85% rpm	4,536	13.2	10.0	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					13.25%	Taxi In	G Idle	5,859	17.1	12.9	5.9	624	58.18	1.16	137.34	0.40	13.50
					10.60%	Hot Refuel	G Idle	4,687	13.7	10.3	11.0	624	58.18	1.16	137.34	0.40	13.50
				Touch-and-Go	13.74%	Approach	85% rpm	6,076	17.7	13.4	1.5	2,595	0.54	5.45	4.43	0.40	7.62
					13.74%	Climbout	IRP	6,076	17.7	13.4	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					13.74%	Circle	85% rpm	6,076	17.7	13.4	1.5	2,595	0.54	5.45	4.43	0.40	7.62
				FCLP	18.88%	Approach	85% rpm	8,349	24.4	18.3	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					18.88%	Climbout	IRP	8,349	24.4	18.3	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					18.88%	Circle	85% rpm	8,349	24.4	18.3	3.0	2,595	0.54	5.45	4.43	0.40	7.62
				GCA Box	3.60%	Approach	85% rpm	1,593	4.7	3.5	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					3.60%	Climbout	IRP	1,593	4.7	3.5	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					3.60%	Circle	85% rpm	1,593	4.7	3.5	4.0	2,595	0.54	5.45	4.43	0.40	7.62
				ACLS	0.52%	Approach	85% rpm	230	0.7	0.5	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					0.52%	Climbout	IRP	230	0.7	0.5	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					0.52%	Circle	85% rpm	230	0.7	0.5	4.0	2,595	0.54	5.45	4.43	0.40	7.62
Eliminated C/D FRS aircraft, subtotal below 3,000 feet					100.0%			44,214	129.1	97.2							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	2	F414-GE-400	87,410	Departure	14.98%	APU Use	On	13,092	38.2	28.8	2.5	197	0.25	6.25	2.00	0.40	0.22
(PHASE 1		F404-GE-400			14.98%	Checks	G Idle	13,092	38.2	28.8	12.0	749	54.20	3.29	88.85	0.40	12.75
TOTALS)		GTC 36-200			14.98%	Taxi Out	G Idle	13,092	38.2	28.8	5.9	749	54.20	3.29	88.85	0.40	12.75
[92 ACFT]					14.98%	AB Takeoff	Max AB	13,092	38.2	28.8	0.4	35,603	4.72	9.47	262.12	0.40	no data
					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
					14.98%	Climbout	IRP	13,092	38.2	28.8	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	2.92%	Straight In	85% rpm	2,549	7.4	5.6	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					12.06%	Overhead In	85% rpm	10,543	30.8	23.2	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					14.98%	Taxi In	G Idle	13,092	38.2	28.8	5.9	749	54.20	3.29	88.85	0.40	12.75
					11.98%	Hot Refuel	G Idle	10,474	30.6	23.0	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	15.55%	Approach	85% rpm	13,591	39.7	29.9	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					15.55%	Climbout	IRP	13,591	39.7	29.9	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					15.55%	Circle	85% rpm	13,591	39.7	29.9	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	15.76%	Approach	85% rpm	13,772	40.2	30.3	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					15.76%	Climbout	IRP	13,772	40.2	30.3	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					15.76%	Circle	85% rpm	13,772	40.2	30.3	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	3.20%	Approach	85% rpm	2,801	8.2	6.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					3.20%	Climbout	IRP	2,801	8.2	6.2	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					3.20%	Circle	85% rpm	2,801	8.2	6.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.51%	Approach	85% rpm	449	1.3	1.0	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.51%	Climbout	IRP	449	1.3	1.0	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.51%	Circle	85% rpm	449	1.3	1.0	4.0	3,357	0.13	9.71	1.40	0.40	6.55
Phase 1 F/A-18E/F total below 3,000 feet					100.00%			87,410	255.2	192.1							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F,	2	F414-GE-400	38,244	Departure	15.24%	APU Use	On	5,827	17.0	12.8	2.5						
F/A-18C/D		F404-GE-400			15.24%	Checks	G Idle	5,827	17.0	12.8	12.0						
(NAS		GTC 36-200			15.24%	Taxi Out	G Idle	5,827	17.0	12.8	5.9						
LEMOORE,					15.24%	AB Takeoff	Max AB	5,827	17.0	12.8	0.4						
PHASE 2					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5						
NET					15.24%	Climbout	IRP	5,827	17.0	12.8	0.7						
CHANGE																	
FROM				Arrival	3.03%	Straight In	85% rpm	1,158	3.4	2.5	1.6						
1997]					12.21%	Overhead In	85% rpm	4,669	13.6	10.3	2.9						
[66 ACFT]					15.24%	Taxi In	G Idle	5,827	17.0	12.8	5.9						
					12.19%	Hot Refuel	G Idle	4,662	13.6	10.2	11.0						
				Touch-and-Go	18.81%	Approach	85% rpm	7,195	21.0	15.8	1.5						
					18.81%	Climbout	IRP	7,195	21.0	15.8	0.3						
					18.81%	Circle	85% rpm	7,195	21.0	15.8	1.5						
				FCLP	12.35%	Approach	85% rpm	4,724	13.8	10.4	2.9						
					12.35%	Climbout	IRP	4,724	13.8	10.4	0.3						
					12.35%	Circle	85% rpm	4,724	13.8	10.4	3.0						
				GCA Box	3.05%	Approach	85% rpm	1,165	3.4	2.6	4.0						
					3.05%	Climbout	IRP	1,165	3.4	2.6	0.7						
					3.05%	Circle	85% rpm	1,165	3.4	2.6	4.0						
				ACLS	0.55%	Approach	85% rpm	211	0.6	0.5	4.0						
					0.55%	Climbout	IRP	211	0.6	0.5	0.7						
					0.55%	Circle	85% rpm	211	0.6	0.5	4.0						
NAS Lemoore Phase 2 net change below 3,000 feet					100.00%			38,244	111.7	84.1							

TABLE E-36. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations Spring - Fall	Average Daily Flight Operations Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
													Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
F/A-18E/F	2	F414-GE-400	113,486	Departure	16.53%	APU Use	On	18,756	54.8	41.2	2.5	197	0.25	6.25	2.00	0.40	0.22
(NAF EL		F404-GE-400			16.53%	Checks	G Idle	18,756	54.8	41.2	12.0	749	54.20	3.29	88.85	0.40	12.75
CENTRO		GTC 36-200			16.53%	Taxi Out	G Idle	18,756	54.8	41.2	5.9	749	54.20	3.29	88.85	0.40	12.75
PHASE 2					16.53%	AB Takeoff	Max AB	18,756	54.8	41.2	0.4	35,603	4.72	9.47	262.12	0.40	no data
TOTAL)					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
[164 ACFT]					16.53%	Climbout	IRP	18,756	54.8	41.2	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	3.05%	Straight In	85% rpm	3,461	10.1	7.6	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					13.48%	Overhead In	85% rpm	15,295	44.7	33.6	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					16.53%	Taxi In	G Idle	18,756	54.8	41.2	5.9	749	54.20	3.29	88.85	0.40	12.75
					13.22%	Hot Refuel	G Idle	15,005	43.8	33.0	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	13.03%	Approach	85% rpm	14,783	43.2	32.5	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					13.03%	Climbout	IRP	14,783	43.2	32.5	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					13.03%	Circle	85% rpm	14,783	43.2	32.5	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	17.12%	Approach	85% rpm	19,434	56.7	42.7	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					17.12%	Climbout	IRP	19,434	56.7	42.7	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					17.12%	Circle	85% rpm	19,434	56.7	42.7	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	2.84%	Approach	85% rpm	3,219	9.4	7.1	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					2.84%	Climbout	IRP	3,219	9.4	7.1	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					2.84%	Circle	85% rpm	3,219	9.4	7.1	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.49%	Approach	85% rpm	551	1.6	1.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.49%	Climbout	IRP	551	1.6	1.2	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.49%	Circle	85% rpm	551	1.6	1.2	4.0	3,357	0.13	9.71	1.40	0.40	6.55
NAF El Centro F/A-18E/F Phase 2 total below 3,000 feet					100.00%			113,486	331.3	249.4							

Notes:

APU = auxiliary power unit (starts aircraft engines and provides electrical power and air conditioning prior to start of main engines)
Checks = preflight engine and component checks
FLCP = field carrier landing practice
GCA = ground controlled approach
ACLS = automated carrier landing system
G Idle = ground idle
AB = afterburner
IRP = intermediate rated power (equivalent to military power setting)

Annual flight operation estimates for added F/A-18E/F aircraft and replaced or eliminated F/A-18C/D aircraft based on naval aviation simulation model (NASMOD) data (ATAC Corporation 1997).
Phase 2 fleet squadron F/A-18E/F aircraft at NAS Lemoore will be replacements for F/A-18C/D aircraft currently based at NAS Lemoore.
Phase 2 fleet squadron F/A-18E/F aircraft at NAF El Centro will be additional new aircraft.
Departures and arrivals each represent a single flight operation; pattern events (T&G, FCLP, GCA box, ACLS) each represent two flight operations (an approach and a climbout).
Flight operation totals and subtotals are the sum of approach mode and climbout mode numbers.
Time-in-mode estimates for F/A-18 operations below 3,000 feet based on Thompson (1997) and U.S. Environmental Protection Agency (1985; 1992).
Engine power setting assumptions based on data from Navy Aircraft Environmental Support Office (AESO) personnel, NAS Lemoore personnel, and U.S. Environmental Protection Agency (1985; 1992).
F/A-18E/F and F/A-18C/D takeoffs assume 100% maximum afterburner use for departures and no afterburner use for touch-and-go, FCLP, GCA, or ACLS patterns (per Lt. Thompson, E/F FIT).
F/A-18 aircraft taxi/idle data assume 100% ground idle conditions (per E/F FIT).
Gaseous pollutant emission rates for F/A-18E/F aircraft are for the F414-GE-400 engine (U.S. Navy 1997).
PM10 emission rates for F/A-18E/F aircraft are from U.S. Navy (1997), based on extrapolations from data for the F404-GE-400 engine.
Emission rates for F/A-18C/D aircraft are based on data for the F404-GE-400 engine as presented in U.S. Navy (1990 and 1998).
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
APU engine emission rates based on data for the GTC 36-200 engine (Coffer 1997), assuming maximum power output (per U.S. Environmental Protection Agency 1992).
APU engines shut off automatically 1 minute after start-up of the main aircraft engines (per Lt. Thompson, E/F FIT).
Hot refueling (refueling while engines are idling) assumed to occur for 80% of aircraft arrivals (per E/F FIT).
Sulfur oxide emission rates are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.
Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).
All values independently rounded for display after calculation.

Data Sources:

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TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	Departure	APU Use	0.1	1.3	0.4	0.1	0.0	0.0	1.0	0.3	0.1	0.0	0.01	0.22	0.07	0.01	0.01
(FRS)		Checks	411.9	25.0	675.2	3.0	96.9	310.0	18.8	508.2	2.3	72.9	70.53	4.28	115.62	0.52	16.59
[36 ACFT]		Taxi Out	202.5	12.3	332.0	1.5	47.6	152.4	9.3	249.9	1.1	35.9	34.68	2.10	56.85	0.26	8.16
		AB Takeoff	56.8	114.0	3,156.0	4.8	0.0	42.8	85.8	2,375.7	3.6	0.0	9.73	19.53	540.46	0.82	0.00
		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	0.8	227.2	4.5	2.6	10.8	0.6	171.0	3.4	2.0	8.1	0.13	38.90	0.77	0.45	1.85
	Arrival	Straight In	0.1	9.3	1.3	0.4	6.3	0.1	7.0	1.0	0.3	4.7	0.02	1.60	0.23	0.07	1.08
		Overhead In	0.8	63.0	9.1	2.6	42.5	0.6	47.4	6.8	2.0	32.0	0.14	10.79	1.56	0.44	7.28
		Taxi In	202.5	12.3	332.0	1.5	47.6	152.4	9.3	249.9	1.1	35.9	34.68	2.10	56.85	0.26	8.16
		Hot Refuel	302.0	18.3	495.1	2.2	71.1	227.4	13.8	372.7	1.7	53.5	51.73	3.14	84.79	0.38	12.17
	Touch-and-Go	Approach	0.8	60.3	8.7	2.5	40.7	0.6	45.4	6.5	1.9	30.6	0.14	10.32	1.49	0.43	6.96
		Climbout	0.5	141.9	2.8	1.6	6.7	0.4	106.8	2.1	1.2	5.1	0.08	24.31	0.48	0.28	1.15
		Circle	0.8	60.3	8.7	2.5	40.7	0.6	45.4	6.5	1.9	30.6	0.14	10.32	1.49	0.43	6.96
	FCLP	Approach	1.2	86.2	12.4	3.6	58.1	0.9	64.9	9.4	2.7	43.8	0.20	14.76	2.13	0.61	9.96
		Climbout	0.4	105.0	2.1	1.2	5.0	0.3	79.0	1.6	0.9	3.8	0.06	17.98	0.36	0.21	0.85
		Circle	1.2	89.2	12.9	3.7	60.1	0.9	67.1	9.7	2.8	45.3	0.20	15.27	2.20	0.63	10.30
	GCA Box	Approach	0.4	31.4	4.5	1.3	21.2	0.3	23.7	3.4	1.0	16.0	0.07	5.38	0.78	0.22	3.63
		Climbout	0.2	64.7	1.3	0.7	3.1	0.2	48.7	1.0	0.6	2.3	0.04	11.09	0.22	0.13	0.53
		Circle	0.4	31.4	4.5	1.3	21.2	0.3	23.7	3.4	1.0	16.0	0.07	5.38	0.78	0.22	3.63
	ACLS	Approach	0.1	4.7	0.7	0.2	3.2	0.0	3.5	0.5	0.1	2.4	0.01	0.80	0.12	0.03	0.54
		Climbout	0.0	9.6	0.2	0.1	0.5	0.0	7.3	0.1	0.1	0.3	0.01	1.65	0.03	0.02	0.08
		Circle	0.1	4.7	0.7	0.2	3.2	0.0	3.5	0.5	0.1	2.4	0.01	0.80	0.12	0.03	0.54
FRS squadron below 3,000 feet			1,183.6	1,172.1	5,065.0	37.6	586.4	890.9	882.3	3,812.6	28.3	441.4	202.69	200.73	867.37	6.44	100.42

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	Departure	APU Use	0.0	0.7	0.2	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.00	0.11	0.04	0.01	0.00
(FLEET,		Checks	208.8	12.7	342.4	1.5	49.1	157.2	9.5	257.7	1.2	37.0	35.76	2.17	58.63	0.26	8.41
PHASE 1)		Taxi Out	102.7	6.2	168.3	0.8	24.2	77.3	4.7	126.7	0.6	18.2	17.58	1.07	28.83	0.13	4.14
[56 ACFT]		AB Takeoff	28.8	57.8	1,600.3	2.4	0.0	21.7	43.5	1,204.6	1.8	0.0	4.93	9.90	274.06	0.42	0.00
		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	0.4	115.2	2.3	1.3	5.5	0.3	86.7	1.7	1.0	4.1	0.07	19.73	0.39	0.23	0.94
	Arrival	Straight In	0.0	3.6	0.5	0.1	2.4	0.0	2.7	0.4	0.1	1.8	0.01	0.62	0.09	0.03	0.42
		Overhead In	0.5	34.0	4.9	1.4	22.9	0.3	25.6	3.7	1.1	17.3	0.08	5.82	0.84	0.24	3.93
		Taxi In	102.7	6.2	168.3	0.8	24.2	77.3	4.7	126.7	0.6	18.2	17.58	1.07	28.83	0.13	4.14
		Hot Refuel	153.2	9.3	251.1	1.1	36.0	115.3	7.0	189.0	0.9	27.1	26.23	1.59	42.99	0.19	6.17
	Touch-and-Go	Approach	0.1	4.4	0.6	0.2	3.0	0.0	3.3	0.5	0.1	2.2	0.01	0.76	0.11	0.03	0.51
		Climbout	0.0	10.4	0.2	0.1	0.5	0.0	7.8	0.2	0.1	0.4	0.01	1.78	0.04	0.02	0.08
		Circle	0.1	4.4	0.6	0.2	3.0	0.0	3.3	0.5	0.1	2.2	0.01	0.76	0.11	0.03	0.51
	FCLP	Approach	0.5	40.5	5.8	1.7	27.3	0.4	30.5	4.4	1.3	20.6	0.09	6.94	1.00	0.29	4.68
		Climbout	0.2	49.4	1.0	0.6	2.3	0.1	37.2	0.7	0.4	1.8	0.03	8.45	0.17	0.10	0.40
		Circle	0.6	41.9	6.0	1.7	28.3	0.4	31.6	4.5	1.3	21.3	0.10	7.18	1.03	0.30	4.84
	GCA Box	Approach	0.1	4.1	0.6	0.2	2.8	0.0	3.1	0.4	0.1	2.1	0.01	0.71	0.10	0.03	0.48
		Climbout	0.0	8.5	0.2	0.1	0.4	0.0	6.4	0.1	0.1	0.3	0.00	1.46	0.03	0.02	0.07
		Circle	0.1	4.1	0.6	0.2	2.8	0.0	3.1	0.4	0.1	2.1	0.01	0.71	0.10	0.03	0.48
	ACLS	Approach	0.0	1.0	0.1	0.0	0.7	0.0	0.8	0.1	0.0	0.5	0.00	0.17	0.03	0.01	0.12
		Climbout	0.0	2.1	0.0	0.0	0.1	0.0	1.6	0.0	0.0	0.1	0.00	0.36	0.01	0.00	0.02
		Circle	0.0	1.0	0.1	0.0	0.7	0.0	0.8	0.1	0.0	0.5	0.00	0.17	0.03	0.01	0.12
Fleetl squadrons below 3,000 ft			598.7	417.6	2,554.4	14.5	236.2	450.7	314.3	1,922.8	10.9	177.8	102.53	71.51	437.43	2.49	40.44

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	Departure	APU Use	0.0	0.8	0.3	0.1	0.0	0.0	0.6	0.2	0.0	0.0	0.01	0.15	0.05	0.01	0.01
(FLEET,		Checks	268.5	16.3	440.2	2.0	63.2	202.1	12.3	331.4	1.5	47.6	45.99	2.79	75.39	0.34	10.82
PHASE 2)		Taxi Out	132.0	8.0	216.4	1.0	31.1	99.4	6.0	162.9	0.7	23.4	22.61	1.37	37.06	0.17	5.32
[72 ACFT]		AB Takeoff	37.1	74.3	2,057.7	3.1	0.0	27.9	56.0	1,548.9	2.4	0.0	6.35	12.73	352.39	0.54	0.00
		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	0.5	148.1	2.9	1.7	7.0	0.4	111.5	2.2	1.3	5.3	0.09	25.36	0.50	0.29	1.21
	Arrival	Straight In	0.1	4.6	0.7	0.2	3.1	0.0	3.5	0.5	0.1	2.4	0.01	0.79	0.11	0.03	0.53
		Overhead In	0.6	43.7	6.3	1.8	29.5	0.4	32.9	4.7	1.4	22.2	0.10	7.49	1.08	0.31	5.05
		Taxi In	132.0	8.0	216.4	1.0	31.1	99.4	6.0	162.9	0.7	23.4	22.61	1.37	37.06	0.17	5.32
		Hot Refuel	196.9	12.0	322.8	1.5	46.3	148.2	9.0	243.0	1.1	34.9	33.72	2.05	55.28	0.25	7.93
	Touch-and-Go	Approach	0.1	5.7	0.8	0.2	3.8	0.1	4.3	0.6	0.2	2.9	0.01	0.97	0.14	0.04	0.66
		Climbout	0.0	13.4	0.3	0.2	0.6	0.0	10.1	0.2	0.1	0.5	0.01	2.29	0.05	0.03	0.11
		Circle	0.1	5.7	0.8	0.2	3.8	0.1	4.3	0.6	0.2	2.9	0.01	0.97	0.14	0.04	0.66
	FCLP	Approach	0.7	52.1	7.5	2.1	35.1	0.5	39.2	5.7	1.6	26.5	0.12	8.92	1.29	0.37	6.02
		Climbout	0.2	63.5	1.3	0.7	3.0	0.2	47.8	0.9	0.5	2.3	0.04	10.87	0.21	0.12	0.52
		Circle	0.7	53.9	7.8	2.2	36.3	0.5	40.6	5.8	1.7	27.4	0.12	9.23	1.33	0.38	6.22
	GCA Box	Approach	0.1	5.3	0.8	0.2	3.6	0.1	4.0	0.6	0.2	2.7	0.01	0.91	0.13	0.04	0.61
		Climbout	0.0	10.9	0.2	0.1	0.5	0.0	8.2	0.2	0.1	0.4	0.01	1.87	0.04	0.02	0.09
		Circle	0.1	5.3	0.8	0.2	3.6	0.1	4.0	0.6	0.2	2.7	0.01	0.91	0.13	0.04	0.61
	ACLS	Approach	0.0	1.3	0.2	0.1	0.9	0.0	1.0	0.1	0.0	0.7	0.00	0.22	0.03	0.01	0.15
		Climbout	0.0	2.7	0.1	0.0	0.1	0.0	2.0	0.0	0.0	0.1	0.00	0.46	0.01	0.01	0.02
		Circle	0.0	1.3	0.2	0.1	0.9	0.0	1.0	0.1	0.0	0.7	0.00	0.22	0.03	0.01	0.15
Fleet2 squadrons below 3,000 ft			769.8	536.9	3,284.4	18.7	303.6	579.5	404.1	2,472.3	14.1	228.6	131.83	91.94	562.45	3.20	52.00

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.0	1.1	0.3	0.1	0.0	0.0	0.8	0.3	0.1	0.0	0.01	0.18	0.06	0.01	0.01
(REPLACED		Checks	299.7	6.0	707.5	2.1	69.5	225.6	4.5	532.6	1.6	52.4	51.33	1.02	121.16	0.35	11.91
FLEET		Taxi Out	147.4	2.9	347.9	1.0	34.2	110.9	2.2	261.8	0.8	25.7	25.24	0.50	59.57	0.17	5.86
SQUADRONS,		AB Takeoff	1.0	72.1	180.7	3.1	0.0	0.8	54.2	136.0	2.4	0.0	0.17	12.34	30.94	0.54	0.00
PHASE 2)		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
[72 ACFT]		Climbout	1.3	104.1	4.3	1.7	11.6	1.0	78.3	3.3	1.2	8.7	0.22	17.82	0.74	0.28	1.99
	Arrival	Straight In	0.2	2.2	1.8	0.2	3.0	0.2	1.6	1.3	0.1	2.3	0.04	0.37	0.30	0.03	0.52
		Overhead In	2.4	24.3	19.8	1.8	34.0	1.8	18.3	14.9	1.3	25.6	0.41	4.16	3.38	0.31	5.82
		Taxi In	147.4	2.9	347.9	1.0	34.2	110.9	2.2	261.8	0.8	25.7	25.24	0.50	59.57	0.17	5.86
		Hot Refuel	219.8	4.4	518.8	1.5	51.0	165.4	3.3	390.6	1.1	38.4	37.64	0.75	88.85	0.26	8.73
	Touch-and-Go	Approach	0.3	3.1	2.5	0.2	4.4	0.2	2.3	1.9	0.2	3.3	0.05	0.53	0.43	0.04	0.75
		Climbout	0.1	9.5	0.4	0.2	1.1	0.1	7.2	0.3	0.1	0.8	0.02	1.63	0.07	0.03	0.18
		Circle	0.3	3.1	2.5	0.2	4.4	0.2	2.3	1.9	0.2	3.3	0.05	0.53	0.43	0.04	0.75
	FCLP	Approach	2.5	25.4	20.6	1.9	35.5	1.9	19.1	15.5	1.4	26.7	0.43	4.35	3.53	0.32	6.08
		Climbout	0.5	40.1	1.7	0.6	4.5	0.4	30.2	1.3	0.5	3.4	0.08	6.87	0.29	0.11	0.77
		Circle	2.6	26.3	21.4	1.9	36.7	2.0	19.8	16.1	1.5	27.6	0.45	4.50	3.66	0.33	6.29
	GCA Box	Approach	0.3	2.5	2.1	0.2	3.5	0.2	1.9	1.6	0.1	2.7	0.04	0.43	0.35	0.03	0.61
		Climbout	0.1	6.8	0.3	0.1	0.8	0.1	5.1	0.2	0.1	0.6	0.01	1.16	0.05	0.02	0.13
		Circle	0.3	2.5	2.1	0.2	3.5	0.2	1.9	1.6	0.1	2.7	0.04	0.43	0.35	0.03	0.61
	ACLS	Approach	0.1	0.6	0.5	0.0	0.8	0.0	0.5	0.4	0.0	0.6	0.01	0.10	0.08	0.01	0.15
		Climbout	0.0	1.6	0.1	0.0	0.2	0.0	1.2	0.1	0.0	0.1	0.00	0.28	0.01	0.00	0.03
		Circle	0.1	0.6	0.5	0.0	0.8	0.0	0.5	0.4	0.0	0.6	0.01	0.10	0.08	0.01	0.15
Replaced C/Ds below 3,000 ft			826.3	342.1	2,183.6	18.0	333.8	622.0	257.5	1,643.7	13.6	251.3	141.50	58.59	373.93	3.09	57.17

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.0	0.9	0.3	0.1	0.0	0.0	0.7	0.2	0.0	0.0	0.01	0.15	0.05	0.01	0.01
(ELIMINATED		Checks	248.4	5.0	586.3	1.7	57.6	187.0	3.7	441.4	1.3	43.4	42.53	0.85	100.41	0.29	9.87
C/D FRS		Taxi Out	122.1	2.4	288.3	0.8	28.3	91.9	1.8	217.0	0.6	21.3	20.91	0.42	49.37	0.14	4.85
AIRCRAFT,		AB Takeoff	0.8	59.7	149.7	2.6	0.0	0.6	45.0	112.7	2.0	0.0	0.14	10.23	25.64	0.44	0.00
PHASE 2)		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
[26 ACFT]		Climbout	1.1	86.2	3.6	1.4	9.6	0.8	64.9	2.7	1.0	7.2	0.18	14.77	0.62	0.23	1.65
	Arrival	Straight In	0.3	2.9	2.4	0.2	4.1	0.2	2.2	1.8	0.2	3.1	0.05	0.50	0.41	0.04	0.70
		Overhead In	1.8	18.1	14.7	1.3	25.3	1.4	13.6	11.1	1.0	19.1	0.31	3.10	2.52	0.23	4.34
		Taxi In	122.1	2.4	288.3	0.8	28.3	91.9	1.8	217.0	0.6	21.3	20.91	0.42	49.37	0.14	4.85
		Hot Refuel	182.1	3.6	429.9	1.3	42.3	137.1	2.7	323.6	0.9	31.8	31.19	0.62	73.63	0.21	7.24
	Touch-and-Go	Approach	1.2	12.5	10.2	0.9	17.5	0.9	9.4	7.7	0.7	13.2	0.21	2.15	1.75	0.16	3.00
		Climbout	0.5	38.3	1.6	0.6	4.3	0.4	28.9	1.2	0.5	3.2	0.08	6.56	0.27	0.10	0.73
		Circle	1.2	12.5	10.2	0.9	17.5	0.9	9.4	7.7	0.7	13.2	0.21	2.15	1.75	0.16	3.00
	FCLP	Approach	3.3	33.3	27.1	2.4	46.6	2.5	25.1	20.4	1.8	35.1	0.57	5.71	4.64	0.42	7.98
		Climbout	0.6	52.7	2.2	0.8	5.9	0.5	39.6	1.7	0.6	4.4	0.11	9.02	0.38	0.14	1.01
		Circle	3.4	34.5	28.0	2.5	48.2	2.6	26.0	21.1	1.9	36.3	0.58	5.90	4.80	0.43	8.25
	GCA Box	Approach	0.9	8.8	7.1	0.6	12.3	0.7	6.6	5.4	0.5	9.2	0.15	1.50	1.22	0.11	2.10
		Climbout	0.3	23.4	1.0	0.4	2.6	0.2	17.6	0.7	0.3	2.0	0.05	4.02	0.17	0.06	0.45
		Circle	0.9	8.8	7.1	0.6	12.3	0.7	6.6	5.4	0.5	9.2	0.15	1.50	1.22	0.11	2.10
	ACLS	Approach	0.1	1.3	1.0	0.1	1.8	0.1	1.0	0.8	0.1	1.3	0.02	0.22	0.18	0.02	0.30
		Climbout	0.0	3.4	0.1	0.1	0.4	0.0	2.5	0.1	0.0	0.3	0.01	0.58	0.02	0.01	0.06
		Circle	0.1	1.3	1.0	0.1	1.8	0.1	1.0	0.8	0.1	1.3	0.02	0.22	0.18	0.02	0.30
Eliminated C/D FRS below 3,000 ft			691.4	412.1	1,860.3	20.4	366.7	520.5	310.2	1,400.3	15.3	276.0	118.41	70.57	318.57	3.49	62.80

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	Departure	APU Use	0.1	2.0	0.6	0.1	0.1	0.1	1.5	0.5	0.1	0.1	0.01	0.34	0.11	0.02	0.01
(PHASE 1		Checks	620.7	37.7	1,017.5	4.6	146.0	467.2	28.4	765.9	3.4	109.9	106.30	6.45	174.25	0.78	25.01
TOTALS)		Taxi Out	305.2	18.5	500.3	2.3	71.8	229.7	13.9	376.6	1.7	54.0	52.26	3.17	85.67	0.39	12.29
[92 ACFT]		AB Takeoff	85.6	171.8	4,756.3	7.3	0.0	64.5	129.4	3,580.3	5.5	0.0	14.67	29.43	814.52	1.24	0.00
		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	1.2	342.4	6.8	3.9	16.3	0.9	257.7	5.1	3.0	12.2	0.20	58.63	1.16	0.67	2.79
	Arrival	Straight In	0.2	12.9	1.9	0.5	8.7	0.1	9.7	1.4	0.4	6.6	0.03	2.22	0.32	0.09	1.49
		Overhead In	1.3	97.0	14.0	4.0	65.4	1.0	73.0	10.5	3.0	49.3	0.22	16.61	2.39	0.68	11.20
		Taxi In	305.2	18.5	500.3	2.3	71.8	229.7	13.9	376.6	1.7	54.0	52.26	3.17	85.67	0.39	12.29
		Hot Refuel	455.2	27.6	746.2	3.4	107.1	342.7	20.8	561.7	2.5	80.6	77.95	4.73	127.79	0.58	18.34
	Touch-	Approach	0.9	64.7	9.3	2.7	43.6	0.7	48.7	7.0	2.0	32.8	0.15	11.08	1.60	0.46	7.47
	and-Go	Climbout	0.5	152.3	3.0	1.7	7.2	0.4	114.7	2.3	1.3	5.4	0.09	26.08	0.52	0.30	1.24
		Circle	0.9	64.7	9.3	2.7	43.6	0.7	48.7	7.0	2.0	32.8	0.15	11.08	1.60	0.46	7.47
	FCLP	Approach	1.7	126.7	18.3	5.2	85.5	1.3	95.4	13.8	3.9	64.3	0.29	21.70	3.13	0.89	14.64
		Climbout	0.5	154.3	3.0	1.8	7.3	0.4	116.2	2.3	1.3	5.5	0.09	26.43	0.52	0.30	1.26
		Circle	1.8	131.1	18.9	5.4	88.4	1.3	98.7	14.2	4.1	66.6	0.30	22.45	3.24	0.92	15.14
	GCA Box	Approach	0.5	35.5	5.1	1.5	24.0	0.4	26.8	3.9	1.1	18.0	0.08	6.09	0.88	0.25	4.11
		Climbout	0.3	73.2	1.4	0.8	3.5	0.2	55.1	1.1	0.6	2.6	0.04	12.54	0.25	0.14	0.60
		Circle	0.5	35.5	5.1	1.5	24.0	0.4	26.8	3.9	1.1	18.0	0.08	6.09	0.88	0.25	4.11
	ACLS	Approach	0.1	5.7	0.8	0.2	3.8	0.1	4.3	0.6	0.2	2.9	0.01	0.98	0.14	0.04	0.66
		Climbout	0.0	11.7	0.2	0.1	0.6	0.0	8.8	0.2	0.1	0.4	0.01	2.01	0.04	0.02	0.10
		Circle	0.1	5.7	0.8	0.2	3.8	0.1	4.3	0.6	0.2	2.9	0.01	0.98	0.14	0.04	0.66
F/A-18E/F Phase 1 below 3,000 ft			1,782.3	1,589.7	7,619.3	52.1	822.6	1,341.6	1,196.7	5,735.4	39.2	619.2	305.21	272.24	1,304.81	8.92	140.86

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F,	Departure	APU Use	0.0	0.9	0.3	0.1	0.0	0.0	0.7	0.2	0.0	0.0	0.01	0.15	0.05	0.01	0.01
F/A-18C/D		Checks	341.2	43.1	163.9	2.8	82.0	256.8	32.4	123.4	2.1	61.7	58.42	7.37	28.07	0.48	14.04
(NAS		Taxi Out	167.7	21.2	80.6	1.4	40.3	126.3	15.9	60.7	1.0	30.4	28.72	3.62	13.80	0.24	6.90
LEMOORE,		AB Takeoff	120.8	114.4	6,483.6	4.7	0.0	91.0	86.1	4,880.5	3.5	0.0	20.69	19.59	1,110.32	0.80	0.00
PHASE 2		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
NET		Climbout	(0.7)	300.2	1.7	2.6	2.0	(0.5)	226.0	1.3	1.9	1.5	(0.11)	51.41	0.30	0.44	0.35
CHANGE																	
FROM	Arrival	Straight In	(0.3)	12.5	(1.6)	0.4	4.8	(0.2)	9.4	(1.2)	0.3	3.6	(0.05)	2.14	(0.27)	0.06	0.81
1997]		Overhead In	(2.3)	98.3	(14.2)	2.7	35.6	(1.7)	74.0	(10.7)	2.0	26.8	(0.40)	16.83	(2.43)	0.46	6.10
[66 ACFT]		Taxi In	167.7	21.2	80.6	1.4	40.3	126.3	15.9	60.7	1.0	30.4	28.72	3.62	13.80	0.24	6.90
		Hot Refuel	250.2	31.6	120.2	2.0	60.1	188.3	23.8	90.5	1.5	45.3	42.85	5.41	20.59	0.35	10.30
	Touch-and-Go	Approach	(0.6)	54.7	(2.6)	1.7	25.5	(0.5)	41.2	(2.0)	1.3	19.2	(0.10)	9.36	(0.44)	0.30	4.38
		Climbout	(0.0)	117.8	1.3	1.1	2.5	(0.0)	88.7	1.0	0.9	1.9	(0.00)	20.18	0.22	0.19	0.43
		Circle	(0.6)	54.7	(2.6)	1.7	25.5	(0.5)	41.2	(2.0)	1.3	19.2	(0.10)	9.36	(0.44)	0.30	4.38
	FCLP	Approach	(3.4)	120.1	(21.9)	3.1	38.5	(2.6)	90.4	(16.5)	2.3	29.0	(0.59)	20.56	(3.76)	0.52	6.59
		Climbout	(0.4)	125.0	0.4	1.0	(0.0)	(0.3)	94.1	0.3	0.8	(0.0)	(0.07)	21.41	0.07	0.17	(0.00)
		Circle	(3.5)	124.2	(22.7)	3.2	39.8	(2.7)	93.5	(17.1)	2.4	30.0	(0.61)	21.27	(3.89)	0.54	6.82
	GCA Box	Approach	(0.6)	29.5	(3.3)	0.9	11.7	(0.4)	22.2	(2.5)	0.6	8.8	(0.10)	5.06	(0.57)	0.15	2.01
		Climbout	(0.1)	53.9	0.4	0.5	0.6	(0.1)	40.6	0.3	0.4	0.5	(0.01)	9.24	0.07	0.08	0.11
		Circle	(0.6)	29.5	(3.3)	0.9	11.7	(0.4)	22.2	(2.5)	0.6	8.8	(0.10)	5.06	(0.57)	0.15	2.01
	ACLS	Approach	(0.1)	5.1	(0.5)	0.2	2.1	(0.1)	3.9	(0.4)	0.1	1.6	(0.02)	0.88	(0.09)	0.03	0.36
		Climbout	(0.0)	9.4	0.1	0.1	0.1	(0.0)	7.1	0.1	0.1	0.1	(0.00)	1.61	0.01	0.01	0.02
		Circle	(0.1)	5.1	(0.5)	0.2	2.1	(0.1)	3.9	(0.4)	0.1	1.6	(0.02)	0.88	(0.09)	0.03	0.36
NASL Phase 2 net, below 3,000 ft			1,034.4	1,372.4	6,859.9	32.4	425.6	778.7	1,033.0	5,163.8	24.4	320.4	177.14	235.02	1,174.75	5.55	72.89

TABLE E-37. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18E/F	Departure	APU Use	0.1	2.8	0.9	0.2	0.1	0.1	2.1	0.7	0.1	0.1	0.02	0.48	0.15	0.03	0.02
(NAF EL		Checks	889.2	54.0	1,457.7	6.6	209.2	669.4	40.6	1,097.3	4.9	157.5	152.28	9.24	249.64	1.12	35.82
CENTRO		Taxi Out	437.2	26.5	716.7	3.2	102.8	329.1	20.0	539.5	2.4	77.4	74.87	4.54	122.74	0.55	17.61
PHASE 2		AB Takeoff	122.7	246.2	6,814.0	10.4	0.0	92.4	185.3	5,129.3	7.8	0.0	21.01	42.16	1,166.91	1.78	0.00
TOTAL)		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
[164 ACFT]		Climbout	1.7	490.5	9.7	5.6	23.3	1.3	369.2	7.3	4.2	17.5	0.29	83.99	1.66	0.96	3.99
	Arrival	Straight In	0.2	17.6	2.5	0.7	11.9	0.2	13.2	1.9	0.5	8.9	0.04	3.01	0.43	0.12	2.03
		Overhead In	1.9	140.7	20.3	5.8	94.9	1.4	105.9	15.3	4.4	71.5	0.32	24.10	3.47	0.99	16.26
		Taxi In	437.2	26.5	716.7	3.2	102.8	329.1	20.0	539.5	2.4	77.4	74.87	4.54	122.74	0.55	17.61
		Hot Refuel	652.1	39.6	1,069.0	4.8	153.4	490.9	29.8	804.7	3.6	115.5	111.68	6.78	183.07	0.82	26.27
	Touch-and-Go	Approach	0.9	70.3	10.1	2.9	47.5	0.7	53.0	7.6	2.2	35.7	0.16	12.05	1.74	0.50	8.13
		Climbout	0.6	165.7	3.3	1.9	7.9	0.4	124.7	2.5	1.4	5.9	0.10	28.37	0.56	0.32	1.35
		Circle	0.9	70.3	10.1	2.9	47.5	0.7	53.0	7.6	2.2	35.7	0.16	12.05	1.74	0.50	8.13
	FCLP	Approach	2.4	178.8	25.8	7.4	120.6	1.8	134.6	19.4	5.5	90.8	0.41	30.62	4.41	1.26	20.65
		Climbout	0.7	217.8	4.3	2.5	10.3	0.6	164.0	3.2	1.9	7.8	0.13	37.30	0.74	0.43	1.77
		Circle	2.5	185.0	26.7	7.6	124.8	1.9	139.2	20.1	5.7	93.9	0.42	31.67	4.57	1.30	21.37
	GCA Box	Approach	0.5	40.8	5.9	1.7	27.6	0.4	30.7	4.4	1.3	20.7	0.09	7.00	1.01	0.29	4.72
		Climbout	0.3	84.2	1.7	1.0	4.0	0.2	63.4	1.3	0.7	3.0	0.05	14.42	0.28	0.17	0.68
		Circle	0.5	40.8	5.9	1.7	27.6	0.4	30.7	4.4	1.3	20.7	0.09	7.00	1.01	0.29	4.72
	ACLS	Approach	0.1	7.0	1.0	0.3	4.7	0.1	5.3	0.8	0.2	3.6	0.02	1.20	0.17	0.05	0.81
		Climbout	0.0	14.4	0.3	0.2	0.7	0.0	10.8	0.2	0.1	0.5	0.01	2.47	0.05	0.03	0.12
		Circle	0.1	7.0	1.0	0.3	4.7	0.1	5.3	0.8	0.2	3.6	0.02	1.20	0.17	0.05	0.81
El Centro Phase 2 below 3,000 ft			2,552.1	2,126.6	10,903.7	70.8	1,126.2	1,921.1	1,600.8	8,207.7	53.3	847.7	437.05	364.18	1,867.26	12.12	192.86

Notes:

APU = auxiliary power unit (starts aircraft engines and provides electrical power and air conditioning prior to start of main engines)

Checks = preflight engine and component checks

FLCP = field carrier landing practice

GCA = ground controlled approach

ACLS = automated carrier landing system

G Idle = ground idle

AB = afterburner

IRP = intermediate rated power (equivalent to military power setting)

Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).

Flight activity and emission rate assumptions are presented in Table E-36.

All values independently rounded for display after calculation.

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TABLE E-38. DATA USED TO ESTIMATE EMISSIONS FROM REMAINING F/A-18C/D AIR OPERATIONS AT THE END OF PHASE 2 FOR THE NAS LEMOORE ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	20,686	Departure	22.78%	APU Use	On	4,713	13.8	10.4	2.5	197	0.25	6.25	2.00	0.40	0.22
(REMAINING		GTC 36-200			22.78%	Checks	G Idle	4,713	13.8	10.4	12.0	624	58.18	1.16	137.34	0.40	13.50
C/D FLEET					22.78%	Taxi Out	G Idle	4,713	13.8	10.4	5.9	624	58.18	1.16	137.34	0.40	13.50
SQUADRONS)					22.78%	AB Takeoff	Max AB	4,713	13.8	10.4	0.4	28,397	0.13	9.22	23.12	0.40	no data
[48 ACFT]					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	8,587	0.31	25.16	1.05	0.40	2.81
					22.78%	Climbout	IRP	4,713	13.8	10.4	0.7	8,587	0.31	25.16	1.05	0.40	2.81
				Arrival	3.16%	Straight In	85% rpm	653	1.9	1.4	1.6	2,595	0.54	5.45	4.43	0.40	7.62
					19.63%	Overhead In	85% rpm	4,060	11.9	8.9	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					22.78%	Taxi In	G Idle	4,713	13.8	10.4	5.9	624	58.18	1.16	137.34	0.40	13.50
					18.22%	Hot Refuel	G Idle	3,770	11.0	8.3	11.0	624	58.18	1.16	137.34	0.40	13.50
				Touch-and-Go	4.87%	Approach	85% rpm	1,007	2.9	2.2	1.5	2,595	0.54	5.45	4.43	0.40	7.62
					4.87%	Climbout	IRP	1,007	2.9	2.2	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					4.87%	Circle	85% rpm	1,007	2.9	2.2	1.5	2,595	0.54	5.45	4.43	0.40	7.62
				FCLP	20.50%	Approach	85% rpm	4,241	12.4	9.3	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					20.50%	Climbout	IRP	4,241	12.4	9.3	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					20.50%	Circle	85% rpm	4,241	12.4	9.3	3.0	2,595	0.54	5.45	4.43	0.40	7.62
				GCA Box	1.49%	Approach	85% rpm	308	0.9	0.7	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					1.49%	Climbout	IRP	308	0.9	0.7	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					1.49%	Circle	85% rpm	308	0.9	0.7	4.0	2,595	0.54	5.45	4.43	0.40	7.62
				ACLS	0.36%	Approach	85% rpm	74	0.2	0.2	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					0.36%	Climbout	IRP	74	0.2	0.2	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					0.36%	Circle	85% rpm	74	0.2	0.2	4.0	2,595	0.54	5.45	4.43	0.40	7.62
Remaining C/D fleet squadrons, subtotal below 3,000 feet					100.0%			20,686	60.4	45.5							

TABLE E-38. DATA USED TO ESTIMATE EMISSIONS FROM REMAINING F/A-18C/D AIR OPERATIONS AT THE END OF PHASE 2 FOR THE NAS LEMOORE ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations Spring - Fall	Average Daily Flight Operations Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	17,006	Departure	13.26%	APU Use	On	2,255	6.6	5.0	2.5	197	0.25	6.25	2.00	0.40	0.22
(REMAINING		GTC 36-200			13.26%	Checks	G Idle	2,255	6.6	5.0	12.0	624	58.18	1.16	137.34	0.40	13.50
C/D FRS					13.26%	Taxi Out	G Idle	2,255	6.6	5.0	5.9	624	58.18	1.16	137.34	0.40	13.50
AIRCRAFT)					13.26%	AB Takeoff	Max AB	2,255	6.6	5.0	0.4	28,397	0.13	9.22	23.12	0.40	no data
[10 ACFT]					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	8,587	0.31	25.16	1.05	0.40	2.81
					13.26%	Climbout	IRP	2,255	6.6	5.0	0.7	8,587	0.31	25.16	1.05	0.40	2.81
				Arrival	2.99%	Straight In	85% rpm	509	1.5	1.1	1.6	2,595	0.54	5.45	4.43	0.40	7.62
					10.27%	Overhead In	85% rpm	1,746	5.1	3.8	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					13.26%	Taxi In	G Idle	2,255	6.6	5.0	5.9	624	58.18	1.16	137.34	0.40	13.50
					10.61%	Hot Refuel	G Idle	1,804	5.3	4.0	11.0	624	58.18	1.16	137.34	0.40	13.50
				Touch-and-Go	13.74%	Approach	85% rpm	2,336	6.8	5.1	1.5	2,595	0.54	5.45	4.43	0.40	7.62
					13.74%	Climbout	IRP	2,336	6.8	5.1	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					13.74%	Circle	85% rpm	2,336	6.8	5.1	1.5	2,595	0.54	5.45	4.43	0.40	7.62
				FCLP	18.88%	Approach	85% rpm	3,211	9.4	7.1	2.9	2,595	0.54	5.45	4.43	0.40	7.62
					18.88%	Climbout	IRP	3,211	9.4	7.1	0.3	8,587	0.31	25.16	1.05	0.40	2.81
					18.88%	Circle	85% rpm	3,211	9.4	7.1	3.0	2,595	0.54	5.45	4.43	0.40	7.62
				GCA Box	3.60%	Approach	85% rpm	613	1.8	1.3	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					3.60%	Climbout	IRP	613	1.8	1.3	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					3.60%	Circle	85% rpm	613	1.8	1.3	4.0	2,595	0.54	5.45	4.43	0.40	7.62
				ACLS	0.52%	Approach	85% rpm	88	0.3	0.2	4.0	2,595	0.54	5.45	4.43	0.40	7.62
					0.52%	Climbout	IRP	88	0.3	0.2	0.7	8,587	0.31	25.16	1.05	0.40	2.81
					0.52%	Circle	85% rpm	88	0.3	0.2	4.0	2,595	0.54	5.45	4.43	0.40	7.62
Remaining C/D FRS aircraft, subtotal below 3,000 feet					100.0%			17,006	49.7	37.4							

TABLE E-38. DATA USED TO ESTIMATE EMISSIONS FROM REMAINING F/A-18C/D AIR OPERATIONS AT THE END OF PHASE 2 FOR THE NAS LEMOORE ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models Used For Emission Rate Data	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations: Spring - Fall	Average Daily Flight Operations: Winter	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	2	F404-GE-400	37,692	Departure	18.49%	APU Use	On	6,968	20.3	15.3	2.5	197	0.25	6.25	2.00	0.40	0.22
(AFTER		GTC 36-200			18.49%	Checks	G Idle	6,968	20.3	15.3	12.0	749	54.20	3.29	88.85	0.40	12.75
PHASE 2)					18.49%	Taxi Out	G Idle	6,968	20.3	15.3	5.9	749	54.20	3.29	88.85	0.40	12.75
[58 ACFT]					18.49%	AB Takeoff	Max AB	6,968	20.3	15.3	0.4	35,603	4.72	9.47	262.12	0.40	no data
					0.00%	NoAB Takeoff	IRP	0	0.0	0.0	0.5	10,986	0.12	34.94	0.69	0.40	1.66
					18.49%	Climbout	IRP	6,968	20.3	15.3	0.7	10,986	0.12	34.94	0.69	0.40	1.66
				Arrival	3.08%	Straight In	85% rpm	1,162	3.4	2.6	1.6	3,357	0.13	9.71	1.40	0.40	6.55
					15.40%	Overhead In	85% rpm	5,806	17.0	12.8	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					18.49%	Taxi In	G Idle	6,968	20.3	15.3	5.9	749	54.20	3.29	88.85	0.40	12.75
					14.79%	Hot Refuel	G Idle	5,574	16.3	12.3	11.0	749	54.20	3.29	88.85	0.40	12.75
				Touch-and-Go	8.87%	Approach	85% rpm	3,343	9.8	7.3	1.5	3,357	0.13	9.71	1.40	0.40	6.55
					8.87%	Climbout	IRP	3,343	9.8	7.3	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					8.87%	Circle	85% rpm	3,343	9.8	7.3	1.5	3,357	0.13	9.71	1.40	0.40	6.55
				FCLP	19.77%	Approach	85% rpm	7,452	21.8	16.4	2.9	3,357	0.13	9.71	1.40	0.40	6.55
					19.77%	Climbout	IRP	7,452	21.8	16.4	0.3	10,986	0.12	34.94	0.69	0.40	1.66
					19.77%	Circle	85% rpm	7,452	21.8	16.4	3.0	3,357	0.13	9.71	1.40	0.40	6.55
				GCA Box	2.44%	Approach	85% rpm	921	2.7	2.0	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					2.44%	Climbout	IRP	921	2.7	2.0	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					2.44%	Circle	85% rpm	921	2.7	2.0	4.0	3,357	0.13	9.71	1.40	0.40	6.55
				ACLS	0.43%	Approach	85% rpm	162	0.5	0.4	4.0	3,357	0.13	9.71	1.40	0.40	6.55
					0.43%	Climbout	IRP	162	0.5	0.4	0.7	10,986	0.12	34.94	0.69	0.40	1.66
					0.43%	Circle	85% rpm	162	0.5	0.4	4.0	3,357	0.13	9.71	1.40	0.40	6.55
Post Phase 2 F/A-18C/D aircraft, below 3,000 feet					100.00%			37,692	110.0	82.8							

Notes:

APU = auxiliary power unit (starts aircraft engines and provides electrical power and air conditioning prior to start of main engines)
Checks = preflight engine and component checks
FLCP = field carrier landing practice
GCA = ground controlled approach
ACLS = automated carrier landing system
G Idle = ground idle
AB = afterburner
IRP = intermediate rated power (equivalent to military power setting)

Annual flight operation estimates for remaining F/A-18C/D aircraft based on naval aviation simulation model (NASMOD) data (ATAC Corporation 1997); see table E-31.
Departures and arrivals each represent a single flight operation; pattern events (T&G, FCLP, GCA box, ACLS) each represent two flight operations (an approach and a climbout).
Flight operation totals and subtotals are the sum of approach mode and climbout mode numbers.
Time-in-mode estimates for F/A-18 operations below 3,000 feet based on Thompson (1997) and U.S. Environmental Protection Agency (1985; 1992).
Engine power setting assumptions based on data from Navy Aircraft Environmental Support Office (AESO) personnel, NAS Lemoore personnel, and U.S. Environmental Protection Agency (1985; 1992).
F/A-18C/D takeoffs assume 100% maximum afterburner use for departures and no afterburner use for touch-and-go, FCLP, GCA, or ACLS patterns (per Lt. Thompson, E/F FIT).
F/A-18 aircraft taxi/idle data assume 100% ground idle conditions (per E/F FIT).
Emission rates for F/A-18C/D aircraft are based on data for the F404-GE-400 engine as presented in U.S. Navy (1990 and 1998).
No PM10 emission tests have been performed on F/A-18C/D aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
APU engine emission rates based on data for the GTC 36-200 engine (Coffer 1997), assuming maximum power output (per U.S. Environmental Protection Agency 1992).
APU engines shut off automatically 1 minute after start-up of the main aircraft engines (per Lt. Thompson, E/F FIT).
Hot refueling (refueling while engines are idling) assumed to occur for 80% of aircraft arrivals (per E/F FIT).
Sulfur oxide emission rates are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.
Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).
All values independently rounded for display after calculation.

Data Sources:

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TABLE E-39. ESTIMATED EMISSIONS FROM REMAINING F/A-18C/D AIR OPERATIONS AT THE END OF PHASE 2 FOR THE NAS LEMOORE ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.0	0.7	0.2	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.00	0.12	0.04	0.01	0.00
(REMAINING		Checks	199.8	4.0	471.6	1.4	46.4	150.4	3.0	355.0	1.0	34.9	34.21	0.68	80.77	0.24	7.94
C/D FLEET		Taxi Out	98.2	2.0	231.9	0.7	22.8	73.9	1.5	174.6	0.5	17.2	16.82	0.34	39.71	0.12	3.90
SQUADRONS)		AB Takeoff	0.7	48.0	120.5	2.1	0.0	0.5	36.2	90.7	1.6	0.0	0.12	8.23	20.63	0.36	0.00
[48 ACFT]		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	0.9	69.4	2.9	1.1	7.7	0.6	52.2	2.2	0.8	5.8	0.15	11.88	0.50	0.19	1.33
	Arrival	Straight In	0.1	1.4	1.2	0.1	2.0	0.1	1.1	0.9	0.1	1.5	0.02	0.25	0.20	0.02	0.34
		Overhead In	1.6	16.2	13.2	1.2	22.7	1.2	12.2	9.9	0.9	17.1	0.27	2.78	2.26	0.20	3.88
		Taxi In	98.2	2.0	231.9	0.7	22.8	73.9	1.5	174.6	0.5	17.2	16.82	0.34	39.71	0.12	3.90
		Hot Refuel	146.5	2.9	345.8	1.0	34.0	110.3	2.2	260.3	0.8	25.6	25.09	0.50	59.22	0.17	5.82
	Touch-and-Go	Approach	0.2	2.1	1.7	0.2	2.9	0.2	1.6	1.3	0.1	2.2	0.04	0.36	0.29	0.03	0.50
		Climbout	0.1	6.4	0.3	0.1	0.7	0.1	4.8	0.2	0.1	0.5	0.01	1.09	0.05	0.02	0.12
		Circle	0.2	2.1	1.7	0.2	2.9	0.2	1.6	1.3	0.1	2.2	0.04	0.36	0.29	0.03	0.50
	FCLP	Approach	1.7	16.9	13.8	1.2	23.7	1.3	12.7	10.4	0.9	17.8	0.29	2.90	2.36	0.21	4.05
		Climbout	0.3	26.8	1.1	0.4	3.0	0.2	20.1	0.8	0.3	2.2	0.06	4.58	0.19	0.07	0.51
		Circle	1.7	17.5	14.2	1.3	24.5	1.3	13.2	10.7	1.0	18.4	0.30	3.00	2.44	0.22	4.19
	GCA Box	Approach	0.2	1.7	1.4	0.1	2.4	0.1	1.3	1.0	0.1	1.8	0.03	0.29	0.24	0.02	0.41
		Climbout	0.1	4.5	0.2	0.1	0.5	0.0	3.4	0.1	0.1	0.4	0.01	0.78	0.03	0.01	0.09
		Circle	0.2	1.7	1.4	0.1	2.4	0.1	1.3	1.0	0.1	1.8	0.03	0.29	0.24	0.02	0.41
	ACLS	Approach	0.0	0.4	0.3	0.0	0.6	0.0	0.3	0.2	0.0	0.4	0.01	0.07	0.06	0.01	0.10
		Climbout	0.0	1.1	0.0	0.0	0.1	0.0	0.8	0.0	0.0	0.1	0.00	0.19	0.01	0.00	0.02
		Circle	0.0	0.4	0.3	0.0	0.6	0.0	0.3	0.2	0.0	0.4	0.01	0.07	0.06	0.01	0.10
Remaining C/Ds below 3,000 ft			550.8	228.1	1,455.6	12.0	222.6	414.6	171.7	1,095.7	9.0	167.5	94.32	39.06	249.27	2.06	38.11

TABLE E-39. ESTIMATED EMISSIONS FROM REMAINING F/A-18C/D AIR OPERATIONS AT THE END OF PHASE 2 FOR THE NAS LEMOORE ALTERNATIVE

			Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
Aircraft Type	Flight Activity	Flight Mode	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.0	0.3	0.1	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.00	0.06	0.02	0.00	0.00
(REMAINING		Checks	95.6	1.9	225.7	0.7	22.2	72.0	1.4	169.9	0.5	16.7	16.37	0.33	38.64	0.11	3.80
C/D FRS		Taxi Out	47.0	0.9	111.0	0.3	10.9	35.4	0.7	83.5	0.2	8.2	8.05	0.16	19.00	0.06	1.87
AIRCRAFT)		AB Takeoff	0.3	23.0	57.6	1.0	0.0	0.2	17.3	43.4	0.8	0.0	0.06	3.94	9.87	0.17	0.00
[10 ACFT]		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	0.4	33.2	1.4	0.5	3.7	0.3	25.0	1.0	0.4	2.8	0.07	5.68	0.24	0.09	0.63
	Arrival	Straight In	0.1	1.1	0.9	0.1	1.6	0.1	0.8	0.7	0.1	1.2	0.02	0.19	0.16	0.01	0.27
		Overhead In	0.7	7.0	5.7	0.5	9.7	0.5	5.2	4.3	0.4	7.3	0.12	1.19	0.97	0.09	1.67
		Taxi In	47.0	0.9	111.0	0.3	10.9	35.4	0.7	83.5	0.2	8.2	8.05	0.16	19.00	0.06	1.87
		Hot Refuel	70.1	1.4	165.5	0.5	16.3	52.8	1.1	124.6	0.4	12.2	12.01	0.24	28.34	0.08	2.79
	Touch-and-Go	Approach	0.5	4.8	3.9	0.4	6.7	0.4	3.6	3.0	0.3	5.1	0.08	0.83	0.67	0.06	1.15
		Climbout	0.2	14.7	0.6	0.2	1.6	0.1	11.1	0.5	0.2	1.2	0.03	2.52	0.11	0.04	0.28
		Circle	0.5	4.8	3.9	0.4	6.7	0.4	3.6	3.0	0.3	5.1	0.08	0.83	0.67	0.06	1.15
	FCLP	Approach	1.3	12.8	10.4	0.9	17.9	1.0	9.6	7.8	0.7	13.5	0.22	2.19	1.78	0.16	3.07
		Climbout	0.2	20.3	0.8	0.3	2.3	0.2	15.2	0.6	0.2	1.7	0.04	3.47	0.14	0.06	0.39
		Circle	1.3	13.3	10.8	1.0	18.5	1.0	10.0	8.1	0.7	14.0	0.22	2.27	1.85	0.17	3.17
	GCA Box	Approach	0.3	3.4	2.7	0.2	4.7	0.3	2.5	2.1	0.2	3.6	0.06	0.58	0.47	0.04	0.81
		Climbout	0.1	9.0	0.4	0.1	1.0	0.1	6.8	0.3	0.1	0.8	0.02	1.55	0.06	0.02	0.17
		Circle	0.3	3.4	2.7	0.2	4.7	0.3	2.5	2.1	0.2	3.6	0.06	0.58	0.47	0.04	0.81
	ACLS	Approach	0.0	0.5	0.4	0.0	0.7	0.0	0.4	0.3	0.0	0.5	0.01	0.08	0.07	0.01	0.12
		Climbout	0.0	1.3	0.1	0.0	0.1	0.0	1.0	0.0	0.0	0.1	0.00	0.22	0.01	0.00	0.02
		Circle	0.0	0.5	0.4	0.0	0.7	0.0	0.4	0.3	0.0	0.5	0.01	0.08	0.07	0.01	0.12
Remaining C/D FRS below 3,000 ft			266.1	158.5	716.0	7.8	141.1	200.3	119.3	538.9	5.9	106.2	45.57	27.15	122.61	1.34	24.16

TABLE E-39. ESTIMATED EMISSIONS FROM REMAINING F/A-18C/D AIR OPERATIONS AT THE END OF PHASE 2 FOR THE NAS LEMOORE ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F/A-18C/D	Departure	APU Use	0.0	1.0	0.3	0.1	0.0	0.0	0.8	0.3	0.1	0.0	0.01	0.18	0.06	0.01	0.01
(AFTER		Checks	295.4	5.9	697.3	2.0	68.5	222.4	4.4	524.9	1.5	51.6	50.59	1.01	119.41	0.35	11.74
PHASE 2)		Taxi Out	145.2	2.9	342.8	1.0	33.7	109.3	2.2	258.1	0.8	25.4	24.87	0.50	58.71	0.17	5.77
[58 ACFT]		AB Takeoff	1.0	71.0	178.1	3.1	0.0	0.8	53.5	134.1	2.3	0.0	0.17	12.16	30.50	0.53	0.00
		NoAB Takeoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
		Climbout	1.3	102.6	4.3	1.6	11.5	1.0	77.2	3.2	1.2	8.6	0.22	17.56	0.73	0.28	1.96
	Arrival	Straight In	0.3	2.6	2.1	0.2	3.6	0.2	1.9	1.6	0.1	2.7	0.04	0.44	0.36	0.03	0.61
		Overhead In	2.3	23.2	18.8	1.7	32.4	1.7	17.4	14.2	1.3	24.4	0.39	3.97	3.23	0.29	5.55
		Taxi In	145.2	2.9	342.8	1.0	33.7	109.3	2.2	258.1	0.8	25.4	24.87	0.50	58.71	0.17	5.77
		Hot Refuel	216.6	4.3	511.3	1.5	50.3	163.0	3.3	384.9	1.1	37.8	37.09	0.74	87.56	0.26	8.61
	Touch-and-Go	Approach	0.7	6.9	5.6	0.5	9.7	0.5	5.2	4.2	0.4	7.3	0.12	1.18	0.96	0.09	1.65
		Climbout	0.3	21.1	0.9	0.3	2.4	0.2	15.9	0.7	0.3	1.8	0.04	3.61	0.15	0.06	0.40
		Circle	0.7	6.9	5.6	0.5	9.7	0.5	5.2	4.2	0.4	7.3	0.12	1.18	0.96	0.09	1.65
	FCLP	Approach	2.9	29.7	24.2	2.2	41.6	2.2	22.4	18.2	1.6	31.3	0.50	5.09	4.14	0.37	7.12
		Climbout	0.6	47.0	2.0	0.7	5.2	0.4	35.4	1.5	0.6	4.0	0.10	8.05	0.34	0.13	0.90
		Circle	3.0	30.8	25.0	2.3	43.0	2.3	23.2	18.8	1.7	32.4	0.52	5.27	4.28	0.39	7.37
	GCA Box	Approach	0.5	5.1	4.1	0.4	7.1	0.4	3.8	3.1	0.3	5.3	0.09	0.87	0.71	0.06	1.21
		Climbout	0.2	13.6	0.6	0.2	1.5	0.1	10.2	0.4	0.2	1.1	0.03	2.32	0.10	0.04	0.26
		Circle	0.5	5.1	4.1	0.4	7.1	0.4	3.8	3.1	0.3	5.3	0.09	0.87	0.71	0.06	1.21
	ACLS	Approach	0.1	0.9	0.7	0.1	1.2	0.1	0.7	0.5	0.0	0.9	0.02	0.15	0.12	0.01	0.21
		Climbout	0.0	2.4	0.1	0.0	0.3	0.0	1.8	0.1	0.0	0.2	0.01	0.41	0.02	0.01	0.05
		Circle	0.1	0.9	0.7	0.1	1.2	0.1	0.7	0.5	0.0	0.9	0.02	0.15	0.12	0.01	0.21
Remaining C/D acft below 3,000 ft			816.9	386.6	2,171.5	19.9	363.6	614.9	291.0	1,634.6	14.9	273.7	139.89	66.21	371.87	3.40	62.27

Notes:

APU = auxiliary power unit (starts aircraft engines and provides electrical power and air conditioning prior to start of main engines)
Checks = preflight engine and component checks
FLCP = field carrier landing practice
GCA = ground controlled approach
ACLS = automated carrier landing system
G Idle = ground idle
AB = afterburner
IRP = intermediate rated power (equivalent to military power setting)

Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).
Flight activity and emission rate assumptions are presented in Table E-38.
All values independently rounded for display after calculation.

Data Sources:

ATAC Corporation. 1997. NAS Lemoore F/A-18E/F Introduction and E-2 Realignment Airfield and Airspace Operational Study. Draft Report.
Coffer, Lyn P. 1997. 8-4-97 Fax. F/A-18E/F Pilot Responses to Questionnaires and Factory Estimated GTC 36-200 APU Exhaust Emissions.
Thompson, S. 1997. 7-18-97 E-Mail memo from Lt. Thompson, E/F FIT, NAS Lemoore re. Best Estimates for Time-In-Mode Values, F/A-18 E/F Aircraft.
U.S. Environmental Protection Agency. 1985. Compilation of Air Pollutant Emission Factors, Volume II (AP-42).
U.S. Environmental Protection Agency. 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources (EPA-450/4-81-026d(revised)).
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes by Precentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A.).

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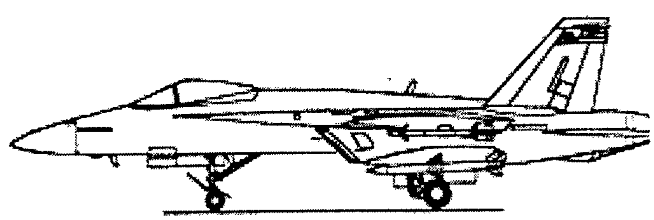


IN-FRAME ENGINE RUN-UP EMISSIONS ANALYSIS

TABLE E-40. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS FOR 1997 BASELINE F/A-18C/D SQUADRONS

Run-Up Type And Squadron	Engine Models Used For Emission Rate Data	Annual Single-Engine Run-Ups	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter		Emissions from Annual Engine Run-Ups (tons/year) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Low Power	F404-GE-400	9,360	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.01	0.24	0.08	0.02	0.01
(Existing C/Ds	GTC 36-200		G Idle	6.5	624	58.18	1.16	137.34	0.40	13.50		18.40	0.37	43.44	0.13	4.27
160 acft)			85% rpm	3.5	2,595	0.54	5.45	4.43	0.40	7.62		0.38	3.86	3.14	0.28	5.40
											Subtotal	18.80	4.47	46.66	0.43	9.68
High Power	F404-GE-400	560	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.01	0.00	0.00	0.00
(Existing C/Ds	GTC 36-200		G Idle	13.0	624	58.18	1.16	137.34	0.40	13.50		2.20	0.04	5.20	0.02	0.51
160 acft)			85% rpm	8.5	2,595	0.54	5.45	4.43	0.40	7.62		0.06	0.56	0.46	0.04	0.78
			IRP	5.0	8,587	0.31	25.16	1.05	0.40	2.81		0.06	5.04	0.21	0.08	0.56
			Max AB	2.0	28,397	0.13	9.22	23.12	0.40	no data		0.03	2.44	6.13	0.11	0.00
											Subtotal	2.35	8.10	12.00	0.24	1.86
Baseline for Existing F/A-18C/D Squadrons												21.15	12.57	58.66	0.67	11.54

TABLE E-40. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS FOR 1997 BASELINE F/A-18C/D SQUADRONS

Notes:

APU = auxiliary power unit; starts aircraft engines and provides electrical power and air conditioning until main engines are started.

G Idle = ground idle

IRP = intermediate rated power (equivalent to military power setting)

AB = afterburner

Annual low power in-frame engine run-ups based on 58.5 single engine tests per aircraft per year (most test events are on a single engine).

Annual high power in-frame engine run-ups based on 3.5 single engine tests per aircraft per year (both engines typically tested at the same time).

Time in mode estimates and power settings for engine tests provided by Navy personnel.

Aircraft engine emission rates based on data from U.S. Navy (1990 and 1998).

PM10 emission rates taken from AESO Reports 6-90 and 9734A.

No PM10 emission tests have been performed on F/A-18C/D aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.

APU engine emission rates based on data for the GTC 36-200 engine (Coffer 1997), assuming maximum power output (per U.S. Environmental Protection Agency 1992).

APU engines shut off automatically 1 minute after start-up of the main aircraft engines (per Lt. Thompson, E/F FIT).

Sulfur oxide emissions are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.

All values independently rounded for display after calculation.

Data Sources:

Coffer, Lyn P. 1997. 8-4-97 Fax, F/A-18E/F Pilot Responses to Questionnaires and Factory Estimated GTC 36-200 APU Exhaust Emissions.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes by Precentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A.).

TABLE E-41. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS BY AIRCRAFT ASSOCIATED WITH PHASE 1 AND PHASE 2 OF THE PROPOSED ACTION

Run-Up Type And Squadron	Engine Models Used For Emission Rate Data	Annual Single-Engine Run-Ups	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)						Emissions from Annual Engine Run-Ups (tons/year)				
						Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter		Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Low Power	F414-GE-400,	2,106	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.05	0.02	0.00	0.00
(E/F FRS;	F404-GE-400		G Idle	6.5	749	54.20	3.29	88.85	0.40	12.75		4.63	0.28	7.59	0.03	1.09
36 Aircraft)	GTC 36-200		85% rpm	3.5	3,357	0.13	9.71	1.40	0.40	6.55		0.03	2.00	0.29	0.08	1.35
											Subtotal	4.66	2.34	7.90	0.12	2.44
High Power	F414-GE-400,	126	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.00	0.00	0.00	0.00
(E/F FRS;	F404-GE-400		G Idle	13.0	749	54.20	3.29	88.85	0.40	12.75		0.55	0.03	0.91	0.00	0.13
36 Aircraft)	GTC 36-200		85% rpm	8.5	3,357	0.13	9.71	1.40	0.40	6.55		0.00	0.29	0.04	0.01	0.20
			IRP	5.0	10,986	0.12	34.94	0.69	0.40	1.66		0.01	2.02	0.04	0.02	0.10
			Max AB	2.0	35,603	4.72	9.47	262.12	0.40	no data		0.35	0.71	19.60	0.03	0.00
											Subtotal	0.92	3.05	20.59	0.07	0.42
Low Power	F414-GE-400,	3,276	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.08	0.03	0.01	0.00
(E/F FLEET 1;	F404-GE-400		G Idle	6.5	749	54.20	3.29	88.85	0.40	12.75		7.20	0.44	11.81	0.05	1.69
56 Aircraft)	GTC 36-200		85% rpm	3.5	3,357	0.13	9.71	1.40	0.40	6.55		0.04	3.11	0.45	0.13	2.10
											Subtotal	7.25	3.64	12.29	0.19	3.80
High Power	F414-GE-400,	196	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.01	0.00	0.00	0.00
(E/F FLEET 1;	F404-GE-400		G Idle	13.0	749	54.20	3.29	88.85	0.40	12.75		0.86	0.05	1.41	0.01	0.20
56 Aircraft)	GTC 36-200		85% rpm	8.5	3,357	0.13	9.71	1.40	0.40	6.55		0.01	0.45	0.07	0.02	0.31
			IRP	5.0	10,986	0.12	34.94	0.69	0.40	1.66		0.01	3.13	0.06	0.04	0.15
			Max AB	2.0	35,603	4.72	9.47	262.12	0.40	no data		0.55	1.10	30.49	0.05	0.00
											Subtotal	1.43	4.75	32.03	0.11	0.66

TABLE E-41. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS BY AIRCRAFT ASSOCIATED WITH PHASE 1 AND PHASE 2 OF THE PROPOSED ACTION

Run-Up Type And Squadron	Engine Models Used For Emission Rate Data	Annual Single-Engine Run-Ups	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter		Emissions from Annual Engine Run-Ups (tons/year) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Low Power	F414-GE-400,	4,212	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.11	0.03	0.01	0.00
(E/F FLEET 2;	F404-GE-400		G Idle	6.5	749	54.20	3.29	88.85	0.40	12.75		9.26	0.56	15.18	0.07	2.18
72 Aircraft)	GTC 36-200		85% rpm	3.5	3,357	0.13	9.71	1.40	0.40	6.55		0.05	4.00	0.58	0.16	2.70
												-----	-----	-----	-----	-----
											Subtotal	9.32	4.67	15.80	0.24	4.88
High Power	F414-GE-400,	252	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.01	0.00	0.00	0.00
(E/F FLEET 2;	F404-GE-400		G Idle	13.0	749	54.20	3.29	88.85	0.40	12.75		1.11	0.07	1.82	0.01	0.26
72 Aircraft)	GTC 36-200		85% rpm	8.5	3,357	0.13	9.71	1.40	0.40	6.55		0.01	0.58	0.08	0.02	0.39
			IRP	5.0	10,986	0.12	34.94	0.69	0.40	1.66		0.01	4.03	0.08	0.05	0.19
			Max AB	2.0	35,603	4.72	9.47	262.12	0.40	no data		0.71	1.42	39.20	0.06	0.00
												-----	-----	-----	-----	-----
											Subtotal	1.84	6.10	41.18	0.14	0.84
Low Power	F404-GE-400	4,212	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.11	0.03	0.01	0.00
(Replaced C/D	GTC 36-200		G Idle	6.5	624	58.18	1.16	137.34	0.40	13.50		8.28	0.17	19.55	0.06	1.92
FLEET; 72 acft)			85% rpm	3.5	2,595	0.54	5.45	4.43	0.40	7.62		0.17	1.74	1.41	0.13	2.43
												-----	-----	-----	-----	-----
											Subtotal	8.46	2.01	21.00	0.19	4.35
High Power	F404-GE-400	252	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.01	0.00	0.00	0.00
(Replaced C/D	GTC 36-200		G Idle	13.0	624	58.18	1.16	137.34	0.40	13.50		0.99	0.02	2.34	0.01	0.23
FLEET; 72 acft)			85% rpm	8.5	2,595	0.54	5.45	4.43	0.40	7.62		0.03	0.25	0.21	0.02	0.35
			IRP	5.0	8,587	0.31	25.16	1.05	0.40	2.81		0.03	2.27	0.09	0.04	0.25
			Max AB	2.0	28,397	0.13	9.22	23.12	0.40	no data		0.02	1.10	2.76	0.05	0.00
												-----	-----	-----	-----	-----
											Subtotal	1.06	3.65	5.40	0.11	0.84

TABLE E-41. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS BY AIRCRAFT ASSOCIATED WITH PHASE 1 AND PHASE 2 OF THE PROPOSED ACTION

Run-Up Type And Squadron	Engine Models Used For Emission Rate Data	Annual Single-Engine Run-Ups	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter		Emissions from Annual Engine Run-Ups (tons/year): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Low Power	F404-GE-400	1,521	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.04	0.01	0.00	0.00
(Removed C/D FRS;	GTC 36-200		G Idle	6.5	624	58.18	1.16	137.34	0.40	13.50		2.99	0.06	7.06	0.02	0.69
26 Aircraft)			85% rpm	3.5	2,595	0.54	5.45	4.43	0.40	7.62		0.06	0.63	0.51	0.05	0.88
												-----	-----	-----	-----	-----
											Subtotal	3.05	0.73	7.58	0.07	1.57
High Power	F404-GE-400	91	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.00	0.00	0.00	0.00
(Removed C/D FRS;	GTC 36-200		G Idle	13.0	624	58.18	1.16	137.34	0.40	13.50		0.36	0.01	0.84	0.00	0.08
26 Aircraft)			85% rpm	8.5	2,595	0.54	5.45	4.43	0.40	7.62		0.01	0.09	0.07	0.01	0.13
			IRP	5.0	8,587	0.31	25.16	1.05	0.40	2.81		0.01	0.82	0.03	0.01	0.09
			Max AB	2.0	28,397	0.13	9.22	23.12	0.40	no data		0.01	0.40	1.00	0.02	0.00
												-----	-----	-----	-----	-----
											Subtotal	0.38	1.32	1.95	0.04	0.30

Notes:

APU = auxiliary power unit; starts aircraft engines and provides electrical power and air conditioning until main engines are started.

G Idle = ground idle

IRP = intermediate rated power (equivalent to military power setting)

AB = afterburner

Annual low power in-frame engine run-ups based on 58.5 single engine tests per aircraft per year (most test events are on a single engine).

Annual high power in-frame engine run-ups based on 3.5 single engine tests per aircraft per year (both engines typically tested at the same time).

Time in mode estimates and power settings for engine tests provided by Navy personnel.

Aircraft engine emission rates based on data from U.S. Navy (1990; 1997; 1998).

PM10 emission rates taken from AESO Report 9725A for F/A-18E/F and from AESO Reports 6-90 and 9734A for F/A-18C/D.

No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.

APU engine emission rates based on data for the GTC 36-200 engine (Coffer 1997), assuming maximum power output (per U.S. Environmental Protection Agency 1992).

APU engines shut off automatically 1 minute after start-up of the main aircraft engines (per Lt. Thompson, E/F FIT).

Sulfur oxide emissions are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.

All values independently rounded for display after calculation.

Data Sources:

Coffer, Lyn P. 1997. 8-4-97 Fax, F/A-18E/F Pilot Responses to Questionnaires and Factory Estimated GTC 36-200 APU Exhaust Emissions.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Navy. 1997. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes by Precentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A.).

TABLE E-42. SUMMARY OF NET CHANGE IN EMISSIONS FROM IN-FRAME ENGINE RUN-UPS

Subtotal Category	Annual Single-Engine Run-Ups	Net Emissions Change From Annual Engine Run-Ups (tons/year)				
		Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Phase 1 E/F FRS Aircraft	2,232	5.58	5.39	28.49	0.19	2.86
Phase 1 E/F Fleet Aircraft	3,472	8.68	8.38	44.31	0.29	4.46
Phase 2 E/F Fleet Aircraft	4,464	11.16	10.78	56.97	0.38	5.73
Phase 2 Replaced C/D Fleet	(4,464)	-9.52	-5.66	-26.39	-0.30	-5.19
Phase 2 Eliminated C/D FRS	(1,612)	-3.44	-2.04	-9.53	-0.11	-1.87
NAS Lemoore Phase 1 Increase	5,704	14.25	13.77	72.80	0.48	7.32
NAS Lemoore Phase 2 Net Change	(1,612)	-1.80	3.08	21.05	-0.03	-1.34
End of Phase 2, NAS Lemoore	4,092	12.46	16.85	93.85	0.45	5.98
NAF El Centro Phase 1 Increase	5,704	14.25	13.77	72.80	0.48	7.32
NAF El Centro Phase 2 Increase	4,464	11.16	10.78	56.97	0.38	5.73
End of Phase 2, NAF El Centro	10,168	25.41	24.55	129.77	0.86	13.05

See Table E-41 for details of engine runup estimates and emission rate data.

TABLE E-43. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS BY F/A-18C/D AIRCRAFT REMAINING AT NAS LEMOORE AFTER PHASE 2

Run-Up Type And Squadron	Engine Models Used For Emission Rate Data	Annual Single-Engine Run-Ups	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)						Emissions from Annual Engine Run-Ups (tons/year)				
						Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter		Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Low Power	F404-GE-400	2,808	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.07	0.02	0.00	0.00
(Remaining C/D	GTC 36-200		G Idle	6.5	624	58.18	1.16	137.34	0.40	13.50		5.52	0.11	13.03	0.04	1.28
FLEET: 48 acft)			85% rpm	3.5	2,595	0.54	5.45	4.43	0.40	7.62		0.11	1.16	0.94	0.09	1.62
											Subtotal	5.64	1.34	14.00	0.13	2.90
High Power	F404-GE-400	168	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.00	0.00	0.00	0.00
(Remaining C/D	GTC 36-200		G Idle	13.0	624	58.18	1.16	137.34	0.40	13.50		0.66	0.01	1.56	0.00	0.15
FLEET: 48 acft)			85% rpm	8.5	2,595	0.54	5.45	4.43	0.40	7.62		0.02	0.17	0.14	0.01	0.24
			IRP	5.0	8,587	0.31	25.16	1.05	0.40	2.81		0.02	1.51	0.06	0.02	0.17
			Max AB	2.0	28,397	0.13	9.22	23.12	0.40	no data		0.01	0.73	1.84	0.03	0.00
											Subtotal	0.71	2.43	3.60	0.07	0.56
Totals for Remaining F/A-18C/D Fleet Squadrons												6.35	3.77	17.60	0.20	3.46

TABLE E-43. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS BY F/A-18C/D AIRCRAFT REMAINING AT NAS LEMOORE AFTER PHASE 2

Run-Up Type And Squadron	Engine Models Used For Emission Rate Data	Annual Single-Engine Run-Ups	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter		Emissions from Annual Engine Run-Ups (tons/year) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Low Power	F404-GE-400	585	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.02	0.00	0.00	0.00
(Remaining C/D	GTC 36-200		G Idle	6.5	624	58.18	1.16	137.34	0.40	13.50		1.15	0.02	2.72	0.01	0.27
FRS; 10 Aircraft)			85% rpm	3.5	2,595	0.54	5.45	4.43	0.40	7.62		0.02	0.24	0.20	0.02	0.34
												-----	-----	-----	-----	-----
											Subtotal	1.17	0.28	2.92	0.03	0.60
High Power	F404-GE-400	35	APU Use	2.5	197	0.25	6.25	2.00	0.40	0.22		0.00	0.00	0.00	0.00	0.00
(Remaining C/D	GTC 36-200		G Idle	13.0	624	58.18	1.16	137.34	0.40	13.50		0.14	0.00	0.32	0.00	0.03
FRS; 10 Aircraft)			85% rpm	8.5	2,595	0.54	5.45	4.43	0.40	7.62		0.00	0.04	0.03	0.00	0.05
			IRP	5.0	8,587	0.31	25.16	1.05	0.40	2.81		0.00	0.32	0.01	0.01	0.04
			Max AB	2.0	28,397	0.13	9.22	23.12	0.40	no data		0.00	0.15	0.38	0.01	0.00
												-----	-----	-----	-----	-----
											Subtotal	0.15	0.51	0.75	0.02	0.12
Totals for Remaining F/A-18C/D FRS Aircraft												1.32	0.79	3.67	0.04	0.72
Total for Combined F/A-18C/D FRS and Fleet Squadron Aircraft												7.67	4.56	21.26	0.24	4.18

TABLE E-43. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE RUN-UPS BY F/A-18C/D AIRCRAFT REMAINING AT NAS LEMOORE AFTER PHASE 2

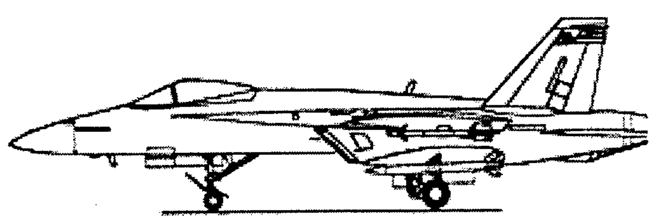
Notes:

APU = auxiliary power unit; starts aircraft engines and provides electrical power and air conditioning until main engines are started.
G Idle = ground idle
IRP = intermediate rated power (equivalent to military power setting)
AB = afterburner

Annual low power in-frame engine run-ups based on 58.5 single engine tests per aircraft per year (most test events are on a single engine).
Annual high power in-frame engine run-ups based on 3.5 single engine tests per aircraft per year (both engines typically tested at the same time).
Time in mode estimates and power settings for engine tests provided by Navy personnel.
Aircraft engine emission rates based on data from U.S. Navy (1990 and 1998).
PM10 emission rates taken from AESO Reports 6-90 and 9734A.
No PM10 emission tests have been performed on F/A-18C/D aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
APU engine emission rates based on data for the GTC 36-200 engine (Coffer 1997), assuming maximum power output (per U.S. Environmental Protection Agency 1992).
APU engines shut off automatically 1 minute after start-up of the main aircraft engines (per Lt. Thompson, E/F FIT).
Sulfur oxide emissions are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.
All values independently rounded for display after calculation.

Data Sources:

Coffer, Lyn P. 1997. 8-4-97 Fax, F/A-18E/F Pilot Responses to Questionnaires and Factory Estimated GTC 36-200 APU Exhaust Emissions.
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes by Precentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A.).



ENGINE TEST CELL EMISSIONS ANALYSIS

TABLE E-44. ENGINE TEST CELL OPERATING PROTOCOLS FOR F/A-18C/D ENGINES

TEST TYPE	TEST PROTOCOL ENGINE RPM SETTING	POWER SETTING, % RPM	TOTAL MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE (lb/test)	EMISSION RATE (POUNDS/1,000 POUNDS FUEL) ROG	NOx	CO	SOx	PM10
SCHEDULE	FL IDLE	FL IDLE	2	815	27	44.50	3.41	123.52	0.40	12.38
CHECKS	13,500	83%	2	2,163	72	0.90	4.87	8.74	0.40	8.37
(BOTH	14,000	86%	2	2,836	95	0.46	5.80	3.32	0.40	7.25
ENGINE	15,000	92%	2	4,687	156	0.35	9.32	1.35	0.40	5.17
MODELS)	15,500	95%	2	5,922	197	0.35	12.75	1.21	0.40	4.21
	IRP	100%	2	8,587	286	0.31	25.16	1.05	0.40	2.81
	MAX AB	MAX AB	2	28,397	947	0.13	9.22	23.12	0.40	no data
	Total		14	7,630	1,780					
BREAK-IN	FL IDLE	FL IDLE	31	815	421	44.50	3.41	123.52	0.40	12.38
TEST,	13,500	83%	2	2,163	72	0.90	4.87	8.74	0.40	8.37
F404-	14,000	86%	2	2,836	95	0.46	5.80	3.32	0.40	7.25
GE-400	15,000	92%	2	4,687	156	0.35	9.32	1.35	0.40	5.17
ENGINE	15,500	95%	4	5,922	395	0.35	12.75	1.21	0.40	4.21
	IRP	100%	25	8,587	3,578	0.31	25.16	1.05	0.40	2.81
	MAX AB	MAX AB	3	28,397	1,420	0.13	9.22	23.12	0.40	no data
	Total		69	5,336	6,137					
BREAK-IN	FL IDLE	FL IDLE	49	815	666	44.50	3.41	123.52	0.40	12.38
TEST,	13,500	83%	2	2,163	72	0.90	4.87	8.74	0.40	8.37
F404-	14,000	86%	10	2,836	473	0.46	5.80	3.32	0.40	7.25
GE-402	15,000	92%	2	4,687	156	0.35	9.32	1.35	0.40	5.17
ENGINE	15,500	95%	11	5,922	1,086	0.35	12.75	1.21	0.40	4.21
	IRP	100%	23	8,587	3,292	0.31	25.16	1.05	0.40	2.81
	MAX AB	MAX AB	3	28,397	1,420	0.13	9.22	23.12	0.40	no data
	Total		100	4,298	7,164					
WEIGHTED	FL IDLE	FL IDLE	18.3	815	249	44.50	3.41	123.52	0.40	12.38
AVERAGE	13,500	83%	2.0	2,163	72	0.90	4.87	8.74	0.40	8.37
TEST	14,000	86%	3.1	2,836	148	0.46	5.80	3.32	0.40	7.25
	15,000	92%	2.0	4,687	156	0.35	9.32	1.35	0.40	5.17
	15,500	95%	3.9	5,922	389	0.35	12.75	1.21	0.40	4.21
	IRP	100%	12.6	8,587	1,805	0.31	25.16	1.05	0.40	2.81
	MAX AB	MAX AB	2.5	28,397	1,171	0.13	9.22	23.12	0.40	no data
	Total		44.5	5,384	3,990					

TABLE E-44. ENGINE TEST CELL OPERATING PROTOCOLS FOR F/A-18C/D ENGINES

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Engine test cell protocols for existing F/A-18 aircraft engines provided by Shubert (1997).
AESO Report 9729 used to convert test protocol rpm settings into percent rpm values.
Fuel flow rates at percent rpm settings taken from AESO Report 9734A.
Emission rates taken from AESO Report 9734A for non-afterburner settings.
Afterbuner emission rates taken from AESO Report 6-90.
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Weighted average test cell use (from NAS Lemoore AIMD staff): 10:9 ratio of schedule checks vs break-in tests; 70% -400 engines, 30% -402 engines.

Data Sources:

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore, to Robert Sculley, Tetra Tech.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Navy. 1997. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California (AESO Memorandum Report No. 9729).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-45. EXTRAPOLATED ENGINE TEST CELL OPERATING PROTOCOLS FOR F/A-18E/F ENGINES

TEST TYPE	TEST PROTOCOL POWER SETTING, % RPM	TOTAL MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE (lb/test)	EMISSION RATE (POUNDS/1,000 POUNDS FUEL) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS	FL IDLE	2.0	862	29	36.63	3.55	72.17	0.40	12.17
	83%	2.0	2,801	93	0.16	8.26	2.66	0.40	7.30
	86%	2.0	3,666	122	0.12	10.53	1.09	0.40	6.19
	92%	2.0	6,044	201	0.12	17.38	0.70	0.40	4.12
	95%	2.0	7,626	254	0.12	22.48	0.69	0.40	3.16
	IRP	2.0	10,986	366	0.12	34.94	0.69	0.40	1.66
	MAX AB	2.0	35,603	1,187	4.72	9.47	262.12	0.40	no data
	Total	14.0	9,655	2,253					
BREAK-IN TEST	FL IDLE	40.0	862	575	36.63	3.55	72.17	0.40	12.17
	83%	2.0	2,801	93	0.16	8.26	2.66	0.40	7.30
	86%	6.0	3,666	367	0.12	10.53	1.09	0.40	6.19
	92%	2.0	6,044	201	0.12	17.38	0.70	0.40	4.12
	95%	7.5	7,626	953	0.12	22.48	0.69	0.40	3.16
	IRP	24.0	10,986	4,394	0.12	34.94	0.69	0.40	1.66
	MAX AB	3.0	35,603	1,780	4.72	9.47	262.12	0.40	no data
	Total	84.5	5,939	8,364					
WEIGHTED AVERAGE TEST	FL IDLE	20.0	862	287	36.63	3.55	72.17	0.40	12.17
	83%	2.0	2,801	93	0.16	8.26	2.66	0.40	7.30
	86%	3.9	3,666	238	0.12	10.53	1.09	0.40	6.19
	92%	2.0	6,044	201	0.12	17.38	0.70	0.40	4.12
	95%	4.6	7,626	585	0.12	22.48	0.69	0.40	3.16
	IRP	12.4	10,986	2,274	0.12	34.94	0.69	0.40	1.66
	MAX AB	2.5	35,603	1,468	4.72	9.47	262.12	0.40	no data
	Total	47.4	6,517	5,148					

Notes: FL IDLE = flight idle setting (higher rpm than ground idle)
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

TABLE E-45. EXTRAPOLATED ENGINE TEST CELL OPERATING PROTOCOLS FOR F/A-18E/F ENGINES

Power settings for engine tests assumed to be the same percent rpm values as used for F/A-18C/D engines.
Times at test settings for break-in tests are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (Table E-44).
Fuel flow rates and emission rates taken from AESO Report 9725A.
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afte mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Weighted average test times based on a 10:9 ratio of schedule checks versus break-in tests (per NAS Lemoore AIMD staff).

Data Sources:

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore, to Robert Sculley, Tetra Tech.

U.S. Navy. 1997. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

TABLE E-46. ENGINE TEST CELL EMISSIONS FOR 1997 BASELINE F/A-18C/D AIRCRAFT AT NAS LEMOORE

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (EXISTING C/D ACFT)	416	FL IDLE	2.0	815	27	0.25	0.02	0.70	0.00	0.07
		83%	2.0	2,163	72	0.01	0.07	0.13	0.01	0.13
		86%	2.0	2,836	95	0.01	0.11	0.07	0.01	0.14
		92%	2.0	4,687	156	0.01	0.30	0.04	0.01	0.17
		95%	2.0	5,922	197	0.01	0.52	0.05	0.02	0.17
		IRP	2.0	8,587	286	0.02	1.50	0.06	0.02	0.17
		MAX AB	2.0	28,397	947	0.03	1.82	4.55	0.08	0.00
		Total	14.0		1,780	0.34	4.35	5.60	0.15	0.85
BREAK-IN TESTS (EXISTING C/D ACFT)	374	FL IDLE	36.4	815	494	4.11	0.32	11.42	0.04	1.14
		83%	2.0	2,163	72	0.01	0.07	0.12	0.01	0.11
		86%	4.4	2,836	208	0.02	0.23	0.13	0.02	0.28
		92%	2.0	4,687	156	0.01	0.27	0.04	0.01	0.15
		95%	6.1	5,922	602	0.04	1.44	0.14	0.05	0.47
		IRP	24.4	8,587	3,492	0.20	16.43	0.69	0.26	1.83
		MAX AB	3.0	28,397	1,420	0.03	2.45	6.14	0.11	0.00
		Total	78.3		6,445	4.43	21.19	18.67	0.48	4.00
TOTALS (REMAINING C/D ACFT)	790	FL IDLE				4.37	0.33	12.12	0.04	1.21
		83%				0.03	0.14	0.25	0.01	0.24
		86%				0.03	0.34	0.19	0.02	0.42
		92%				0.02	0.58	0.08	0.02	0.32
		95%				0.05	1.96	0.19	0.06	0.65
		IRP				0.22	17.93	0.75	0.29	2.00
		MAX AB				0.06	4.26	10.69	0.18	0.00
		Total				4.77	25.54	24.27	0.63	4.85

TABLE E-46. ENGINE TEST CELL EMISSIONS FOR 1997 BASELINE F/A-18C/D AIRCRAFT AT NAS LEMOORE

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Table E-44.
No PM10 emission tests have been performed on F/A-18C/D aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Times at test settings for break-in tests on F/A-18C/D engines are a weighted average of test times for F404-GE-400 engines (70%) and F404-GE-402 engines (30%) based on data in Shubert (1997).
Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).
Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-47. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, FRS SQUADRON

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (E/F FRS)	94	FL IDLE	2.0	862	29	0.05	0.00	0.10	0.00	0.02
		83%	2.0	2,801	93	0.00	0.04	0.01	0.00	0.03
		86%	2.0	3,666	122	0.00	0.06	0.01	0.00	0.04
		92%	2.0	6,044	201	0.00	0.16	0.01	0.00	0.04
		95%	2.0	7,626	254	0.00	0.27	0.01	0.00	0.04
		IRP	2.0	10,986	366	0.00	0.60	0.01	0.01	0.03
		MAX AB	2.0	35,603	1,187	0.26	0.53	14.62	0.02	0.00
		Total	14.0		2,253	0.32	1.66	14.76	0.04	0.19
BREAK-IN TESTS (E/F FRS)	84	FL IDLE	40.0	862	575	0.88	0.09	1.74	0.01	0.29
		83%	2.0	2,801	93	0.00	0.03	0.01	0.00	0.03
		86%	6.0	3,666	367	0.00	0.16	0.02	0.01	0.10
		92%	2.0	6,044	201	0.00	0.15	0.01	0.00	0.03
		95%	7.5	7,626	953	0.00	0.90	0.03	0.02	0.13
		IRP	24.0	10,986	4,394	0.02	6.45	0.13	0.07	0.31
		MAX AB	3.0	35,603	1,780	0.35	0.71	19.60	0.03	0.00
		Total	84.5		8,364	1.27	8.48	21.53	0.14	0.89
TOTALS (E/F FRS)	178	FL IDLE				0.93	0.09	1.84	0.01	0.31
		83%				0.00	0.07	0.02	0.00	0.06
		86%				0.00	0.22	0.02	0.01	0.13
		92%				0.00	0.31	0.01	0.01	0.07
		95%				0.01	1.17	0.04	0.02	0.16
		IRP				0.02	7.05	0.14	0.08	0.33
		MAX AB				0.62	1.24	34.22	0.05	0.00
		Total				1.59	10.15	36.29	0.18	1.07

TABLE E-47. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, FRS SQUADRON

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Tables E-44 and E-45.

No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.

Times at test settings for break-in tests on F/A-18E/F engines are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (see Table E-44).

Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).

Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

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U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-48. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, PHASE 1 FLEET SQUADRONS

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (FLEET 1)	146	FL IDLE	2.0	862	29	0.08	0.01	0.15	0.00	0.03
		83%	2.0	2,801	93	0.00	0.06	0.02	0.00	0.05
		86%	2.0	3,666	122	0.00	0.09	0.01	0.00	0.06
		92%	2.0	6,044	201	0.00	0.26	0.01	0.01	0.06
		95%	2.0	7,626	254	0.00	0.42	0.01	0.01	0.06
		IRP	2.0	10,986	366	0.00	0.93	0.02	0.01	0.04
		MAX AB	2.0	35,603	1,187	0.41	0.82	22.71	0.03	0.00
		Total	14.0		2,253	0.50	2.58	22.93	0.07	0.29
BREAK-IN TESTS (FLEET 1)	131	FL IDLE	40.0	862	575	1.38	0.13	2.72	0.02	0.46
		83%	2.0	2,801	93	0.00	0.05	0.02	0.00	0.04
		86%	6.0	3,666	367	0.00	0.25	0.03	0.01	0.15
		92%	2.0	6,044	201	0.00	0.23	0.01	0.01	0.05
		95%	7.5	7,626	953	0.01	1.40	0.04	0.02	0.20
		IRP	24.0	10,986	4,394	0.03	10.06	0.20	0.12	0.48
		MAX AB	3.0	35,603	1,780	0.55	1.10	30.56	0.05	0.00
		Total	84.5		8,364	1.98	13.23	33.57	0.22	1.38
TOTALS (FLEET 1)	277	FL IDLE				1.46	0.14	2.87	0.02	0.48
		83%				0.00	0.11	0.03	0.01	0.09
		86%				0.00	0.35	0.04	0.01	0.20
		92%				0.00	0.48	0.02	0.01	0.11
		95%				0.01	1.82	0.06	0.03	0.26
		IRP				0.04	10.99	0.22	0.13	0.52
		MAX AB				0.96	1.92	53.27	0.08	0.00
		Total				2.47	15.82	56.50	0.28	1.67

TABLE E-48. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, PHASE 1 FLEET SQUADRONS

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Tables E-44 and E-45.

No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.

Times at test settings for break-in tests on F/A-18E/F engines are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (see Table E-44).

Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).

Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

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U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.

U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-49. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, PHASE 2 FLEET SQUADRONS

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR)				
						ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (FLEET 2)	187	FL IDLE	2.0	862	29	0.10	0.01	0.19	0.00	0.03
		83%	2.0	2,801	93	0.00	0.07	0.02	0.00	0.06
		86%	2.0	3,666	122	0.00	0.12	0.01	0.00	0.07
		92%	2.0	6,044	201	0.00	0.33	0.01	0.01	0.08
		95%	2.0	7,626	254	0.00	0.53	0.02	0.01	0.08
		IRP	2.0	10,986	366	0.00	1.20	0.02	0.01	0.06
		MAX AB	2.0	35,603	1,187	0.52	1.05	29.09	0.04	0.00
		Total	14.0		2,253	0.63	3.31	29.37	0.08	0.38
BREAK-IN TESTS (FLEET 2)	168	FL IDLE	40.0	862	575	1.77	0.17	3.48	0.02	0.59
		83%	2.0	2,801	93	0.00	0.06	0.02	0.00	0.06
		86%	6.0	3,666	367	0.00	0.32	0.03	0.01	0.19
		92%	2.0	6,044	201	0.00	0.29	0.01	0.01	0.07
		95%	7.5	7,626	953	0.01	1.80	0.06	0.03	0.25
		IRP	24.0	10,986	4,394	0.04	12.90	0.25	0.15	0.61
		MAX AB	3.0	35,603	1,780	0.71	1.42	39.20	0.06	0.00
		Total	84.5		8,364	2.53	16.97	43.06	0.28	1.77
TOTALS (FLEET 2)	355	FL IDLE				1.87	0.18	3.68	0.02	0.62
		83%				0.00	0.14	0.04	0.01	0.12
		86%				0.01	0.44	0.05	0.02	0.26
		92%				0.00	0.62	0.03	0.01	0.15
		95%				0.01	2.33	0.07	0.04	0.33
		IRP				0.05	14.09	0.28	0.16	0.67
		MAX AB				1.23	2.47	68.28	0.10	0.00
		Total				3.17	20.28	72.42	0.37	2.15

TABLE E-49. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, PHASE 2 FLEET SQUADRONS

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Tables E-44 and E-45.

No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.

Times at test settings for break-in tests on F/A-18E/F engines are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (see Table E-44).

Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).

Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.

U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-50. ENGINE TEST CELL EMISSIONS FOR REPLACED F/A-18C/D AIRCRAFT SQUADRONS

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (REPLACED C/D FLEET)	187	FL IDLE	2.0	815	27	0.11	0.01	0.31	0.00	0.03
		83%	2.0	2,163	72	0.01	0.03	0.06	0.00	0.06
		86%	2.0	2,836	95	0.00	0.05	0.03	0.00	0.06
		92%	2.0	4,687	156	0.01	0.14	0.02	0.01	0.08
		95%	2.0	5,922	197	0.01	0.24	0.02	0.01	0.08
		IRP	2.0	8,587	286	0.01	0.67	0.03	0.01	0.08
		MAX AB	2.0	28,397	947	0.01	0.82	2.05	0.04	0.00
		Total	14.0		1,780	0.15	1.95	2.52	0.07	0.38
BREAK-IN TESTS (REPLACED C/D FLEET)	168	FL IDLE	36.4	815	494	1.85	0.14	5.13	0.02	0.51
		83%	2.0	2,163	72	0.01	0.03	0.05	0.00	0.05
		86%	4.4	2,836	208	0.01	0.10	0.06	0.01	0.13
		92%	2.0	4,687	156	0.00	0.12	0.02	0.01	0.07
		95%	6.1	5,922	602	0.02	0.64	0.06	0.02	0.21
		IRP	24.4	8,587	3,492	0.09	7.38	0.31	0.12	0.82
		MAX AB	3.0	28,397	1,420	0.02	1.10	2.76	0.05	0.00
		Total	78.3		6,445	1.99	9.52	8.39	0.22	1.80
TOTALS (REPLACED C/D FLEET)	355	FL IDLE				1.96	0.15	5.44	0.02	0.55
		83%				0.01	0.06	0.11	0.01	0.11
		86%				0.01	0.15	0.09	0.01	0.19
		92%				0.01	0.26	0.04	0.01	0.14
		95%				0.02	0.88	0.08	0.03	0.29
		IRP				0.10	8.05	0.34	0.13	0.90
		MAX AB				0.03	1.92	4.80	0.08	0.00
		Total				2.14	11.47	10.90	0.28	2.18

TABLE E-50. ENGINE TEST CELL EMISSIONS FOR REPLACED F/A-18C/D AIRCRAFT SQUADRONS

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Table E-44.
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Times at test settings for break-in tests on F/A-18C/D engines are a weighted average of test times for F404-GE-400 engines (70%) and F404-GE-402 engines (30%) based on data in Shubert (1997).
Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).
Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.

U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-51. ENGINE TEST CELL EMISSIONS FOR ELIMINATED F/A-18C/D FRS SQUADRON AIRCRAFT

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (ELIMINATED C/D FRS)	68	FL IDLE	2.0	815	27	0.04	0.00	0.11	0.00	0.01
		83%	2.0	2,163	72	0.00	0.01	0.02	0.00	0.02
		86%	2.0	2,836	95	0.00	0.02	0.01	0.00	0.02
		92%	2.0	4,687	156	0.00	0.05	0.01	0.00	0.03
		95%	2.0	5,922	197	0.00	0.09	0.01	0.00	0.03
		IRP	2.0	8,587	286	0.00	0.24	0.01	0.00	0.03
		MAX AB	2.0	28,397	947	0.00	0.30	0.74	0.01	0.00
		Total	14.0		1,780	0.06	0.71	0.92	0.02	0.14
BREAK-IN TESTS (ELIMINATED C/D FRS)	61	FL IDLE	36.4	815	494	0.67	0.05	1.86	0.01	0.19
		83%	2.0	2,163	72	0.00	0.01	0.02	0.00	0.02
		86%	4.4	2,836	208	0.00	0.04	0.02	0.00	0.05
		92%	2.0	4,687	156	0.00	0.04	0.01	0.00	0.02
		95%	6.1	5,922	602	0.01	0.23	0.02	0.01	0.08
		IRP	24.4	8,587	3,492	0.03	2.68	0.11	0.04	0.30
		MAX AB	3.0	28,397	1,420	0.01	0.40	1.00	0.02	0.00
		Total	78.3		6,445	0.72	3.46	3.04	0.08	0.65
TOTALS (ELIMINATED C/D FRS)	129	FL IDLE				0.71	0.05	1.98	0.01	0.20
		83%				0.00	0.02	0.04	0.00	0.04
		86%				0.00	0.06	0.03	0.00	0.07
		92%				0.00	0.09	0.01	0.00	0.05
		95%				0.01	0.32	0.03	0.01	0.11
		IRP				0.04	2.92	0.12	0.05	0.33
		MAX AB				0.01	0.70	1.75	0.03	0.00
		Total				0.78	4.17	3.96	0.10	0.79

TABLE E-51. ENGINE TEST CELL EMISSIONS FOR ELIMINATED F/A-18C/D FRS SQUADRON AIRCRAFT

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Table E-44.

No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.

Times at test settings for break-in tests on F/A-18C/D engines are a weighted average of test times for F404-GE-400 engines (70%) and F404-GE-402 engines (30%) based on data in Shubert (1997).

Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).

Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

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Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

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U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.

U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-52. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, PHASE 1 TOTALS

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (PHASE 1 TOTALS)	240	FL IDLE	2.0	862	29	0.13	0.01	0.25	0.00	0.04
		83%	2.0	2,801	93	0.00	0.09	0.03	0.00	0.08
		86%	2.0	3,666	122	0.00	0.15	0.02	0.01	0.09
		92%	2.0	6,044	201	0.00	0.42	0.02	0.01	0.10
		95%	2.0	7,626	254	0.00	0.69	0.02	0.01	0.10
		IRP	2.0	10,986	366	0.01	1.54	0.03	0.02	0.07
		MAX AB	2.0	35,603	1,187	0.67	1.35	37.33	0.06	0.00
		Total	14.0		2,253	0.81	4.25	37.69	0.11	0.48
BREAK-IN TESTS (PHASE 1 TOTALS)	215	FL IDLE	40.0	862	575	2.26	0.22	4.46	0.02	0.75
		83%	2.0	2,801	93	0.00	0.08	0.03	0.00	0.07
		86%	6.0	3,666	367	0.00	0.41	0.04	0.02	0.24
		92%	2.0	6,044	201	0.00	0.38	0.02	0.01	0.09
		95%	7.5	7,626	953	0.01	2.30	0.07	0.04	0.32
		IRP	24.0	10,986	4,394	0.06	16.51	0.33	0.19	0.78
		MAX AB	3.0	35,603	1,780	0.90	1.81	50.16	0.08	0.00
		Total	84.5		8,364	3.24	21.72	55.10	0.36	2.27
TOTALS (PHASE 1 TOTALS)	455	FL IDLE				2.39	0.23	4.71	0.03	0.79
		83%				0.00	0.18	0.06	0.01	0.16
		86%				0.01	0.57	0.06	0.02	0.33
		92%				0.01	0.80	0.03	0.02	0.19
		95%				0.02	2.99	0.09	0.05	0.42
		IRP				0.06	18.04	0.36	0.21	0.86
		MAX AB				1.58	3.16	87.49	0.13	0.00
		Total				4.06	25.96	92.79	0.47	2.75

TABLE E-52. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, PHASE 1 TOTALS

Notes: FL IDLE = flight idle setting (higher rpm than ground idle): used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Tables E-44 and E-45.
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Times at test settings for break-in tests on F/A-18E/F engines are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (see Table E-44).
Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).
Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.

Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

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U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).

U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-53. NET CHANGE IN ENGINE TEST CELL EMISSIONS FOR F/A-18 AIRCRAFT, NAS LEMOORE PHASE 2 TOTALS

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	NET CHANGE IN ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (PHASE 2 NET CHANGE, NAS LEMOORE)	172	FL IDLE	2.0			0.07	0.01	0.01	0.00	0.03
		83%	2.0			-0.01	0.12	-0.03	0.00	0.07
		86%	2.0			-0.00	0.20	-0.01	0.01	0.07
		92%	2.0			-0.00	0.56	0.00	0.01	0.07
		95%	2.0			-0.00	0.90	0.01	0.01	0.07
		IRP	2.0			-0.00	1.81	0.02	0.02	0.03
		MAX AB	2.0			1.18	1.29	63.62	0.05	0.00
		Total	14.0			1.24	4.90	63.63	0.10	0.34
BREAK-IN TESTS (PHASE 2 NET CHANGE, NAS LEMOORE)	154	FL IDLE	40.0			1.51	0.20	0.95	0.02	0.64
		83%	2.0			-0.00	0.11	-0.02	0.00	0.06
		86%	6.0			-0.00	0.60	-0.00	0.02	0.26
		92%	2.0			-0.00	0.50	0.00	0.01	0.07
		95%	7.5			-0.00	3.22	0.04	0.05	0.29
		IRP	24.0			-0.02	19.34	0.16	0.18	0.27
		MAX AB	3.0			1.59	1.73	85.60	0.07	0.00
		Total	84.5			3.07	25.71	86.73	0.35	1.59
TOTALS (PHASE 2 NET CHANGE, NAS LEMOORE)	326	FL IDLE				1.58	0.21	0.96	0.02	0.67
		83%				-0.01	0.23	-0.05	0.01	0.13
		86%				-0.00	0.81	-0.01	0.02	0.34
		92%				-0.00	1.07	0.01	0.02	0.14
		95%				-0.00	4.12	0.05	0.06	0.35
		IRP				-0.02	21.16	0.18	0.19	0.30
		MAX AB				2.77	3.02	149.22	0.12	0.00
		Total				4.30	30.60	150.35	0.45	1.93

TABLE E-53. NET CHANGE IN ENGINE TEST CELL EMISSIONS FOR F/A-18 AIRCRAFT, NAS LEMOORE PHASE 2 TOTALS

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Tables E-44 and E-45.
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Times at test settings for break-in tests on F/A-18E/F engines are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (see Table E-44).
Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).
Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.
Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.
Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.
U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).
U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-54. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, NAF EL CENTRO PHASE 2 TOTALS

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR)				
						ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (PHASE 2 TOTALS, NAF EL CENTRO)	427	FL IDLE	2.0	862	29	0.22	0.02	0.44	0.00	0.07
		83%	2.0	2,801	93	0.00	0.16	0.05	0.01	0.15
		86%	2.0	3,666	122	0.00	0.27	0.03	0.01	0.16
		92%	2.0	6,044	201	0.01	0.75	0.03	0.02	0.18
		95%	2.0	7,626	254	0.01	1.22	0.04	0.02	0.17
		IRP	2.0	10,986	366	0.01	2.73	0.05	0.03	0.13
		MAX AB	2.0	35,603	1,187	1.20	2.40	66.41	0.10	0.00
		Total	14.0		2,253	1.45	7.56	67.06	0.19	0.86
BREAK-IN TESTS (PHASE 2 TOTALS, NAF EL CENTRO)	383	FL IDLE	40.0	862	575	4.03	0.39	7.94	0.04	1.34
		83%	2.0	2,801	93	0.00	0.15	0.05	0.01	0.13
		86%	6.0	3,666	367	0.01	0.74	0.08	0.03	0.43
		92%	2.0	6,044	201	0.00	0.67	0.03	0.02	0.16
		95%	7.5	7,626	953	0.02	4.10	0.13	0.07	0.58
		IRP	24.0	10,986	4,394	0.10	29.40	0.58	0.34	1.40
		MAX AB	3.0	35,603	1,780	1.61	3.23	89.36	0.14	0.00
		Total	84.5		8,364	5.78	38.68	98.16	0.64	4.04
TOTALS (PHASE 2 TOTALS, NAF EL CENTRO)	810	FL IDLE				4.26	0.41	8.38	0.05	1.41
		83%				0.01	0.31	0.10	0.02	0.28
		86%				0.01	1.01	0.10	0.04	0.60
		92%				0.01	1.42	0.06	0.03	0.34
		95%				0.03	5.32	0.16	0.09	0.75
		IRP				0.11	32.13	0.63	0.37	1.53
		MAX AB				2.80	5.63	155.77	0.24	0.00
		Total				7.23	46.24	165.22	0.83	4.90

TABLE E-54. ENGINE TEST CELL EMISSIONS FOR ADDED F/A-18E/F AIRCRAFT, NAF EL CENTRO PHASE 2 TOTALS

Notes: FL IDLE = flight idle setting (higher rpm than ground idle): used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Tables E-44 and E-45.
No PM10 emission tests have been performed on F/A-18C/D or F/A-18E/F aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Times at test settings for break-in tests on F/A-18E/F engines are an unweighted average of test times for F404-GE-400 and F404-GE-402 engines (see Table E-44).
Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).
Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.
Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.
Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.
U.S. Navy. 1997b. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised. (AESO Memo Report No. 9725A.).
U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).

TABLE E-55. ENGINE TEST CELL EMISSIONS FOR F/A-18C/D AIRCRAFT REMAINING AFTER NAS LEMOORE PHASE 2

TEST TYPE	ANNUAL NUMBER OF TESTS	POWER SETTING, % RPM	AVERAGE MINUTES AT POWER SETTING	FUEL FLOW RATE (lb/hr)	FUEL USE PER TEST (lb/test)	ANNUAL EMISSIONS (TONS PER YEAR) ROG	NOx	CO	SOx	PM10
SCHEDULE CHECKS (REMAINING C/D ACFT)	151	FL IDLE	2.0	815	27	0.09	0.01	0.25	0.00	0.03
		83%	2.0	2,163	72	0.00	0.03	0.05	0.00	0.05
		86%	2.0	2,836	95	0.00	0.04	0.02	0.00	0.05
		92%	2.0	4,687	156	0.00	0.11	0.02	0.00	0.06
		95%	2.0	5,922	197	0.01	0.19	0.02	0.01	0.06
		IRP	2.0	8,587	286	0.01	0.54	0.02	0.01	0.06
		MAX AB	2.0	28,397	947	0.01	0.66	1.65	0.03	0.00
		Total	14.0		1,780	0.12	1.58	2.03	0.05	0.31
BREAK-IN TESTS (REMAINING C/D ACFT)	136	FL IDLE	36.4	815	494	1.50	0.11	4.15	0.01	0.42
		83%	2.0	2,163	72	0.00	0.02	0.04	0.00	0.04
		86%	4.4	2,836	208	0.01	0.08	0.05	0.01	0.10
		92%	2.0	4,687	156	0.00	0.10	0.01	0.00	0.05
		95%	6.1	5,922	602	0.01	0.52	0.05	0.02	0.17
		IRP	24.4	8,587	3,492	0.07	5.97	0.25	0.09	0.67
		MAX AB	3.0	28,397	1,420	0.01	0.89	2.23	0.04	0.00
		Total	78.3		6,445	1.61	7.71	6.79	0.18	1.45
TOTALS (REMAINING C/D ACFT)	287	FL IDLE				1.59	0.12	4.41	0.01	0.44
		83%				0.01	0.05	0.09	0.00	0.09
		86%				0.01	0.12	0.07	0.01	0.15
		92%				0.01	0.21	0.03	0.01	0.12
		95%				0.02	0.71	0.07	0.02	0.24
		IRP				0.08	6.52	0.27	0.10	0.73
		MAX AB				0.02	1.55	3.88	0.07	0.00
		Total				1.74	9.28	8.82	0.23	1.76

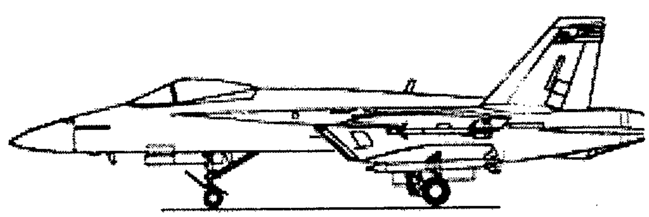
TABLE E-55. ENGINE TEST CELL EMISSIONS FOR F/A-18C/D AIRCRAFT REMAINING AFTER NAS LEMOORE PHASE 2

Notes: FL IDLE = flight idle setting (higher rpm than ground idle); used on aircraft carriers
IRP = intermediate rated power (equivalent to military setting)
AB = afterburner setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Test cell protocols and associated emission rates are presented in Table E-44.
No PM10 emission tests have been performed on F/A-18C/D aircraft engines in afterburner mode; the absence of a visible emissions plume suggests low PM10 emission rates.
Times at test settings for break-in tests on F/A-18C/D engines are a weighted average of test times for F404-GE-400 engines (70%) and F404-GE-402 engines (30%) based on data in Shubert (1997).
Annual engine test cell use rate is 4.94 tests per aircraft based on recent fuel use at NAS Lemoore engine test cells (469,567 gallons in 12 months, 3,990 pounds fuel per test, 6.714 pounds per gallon fuel density [from MSDS data for JP-5], 160 F/A-18 aircraft).
Mix of tests by test type based on a 10:9 ratio of schedule checks versus break-in tests (Shubert 1997).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.
Canadian Centre for Occupational Health and Safety. 1997. MSDS Database. CD-ROM.
Shubert, Chris. 1997. 10-31-97 Fax, AIMD Test Cell Statistics. Fax sent by Chris Shubert, NAS Lemoore.
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy. 1997a. Comparison of Three Emission Reports on Two Data Sets for the F404-GE-400 and -402 Engines at Naval Air Station, Lemoore, California. AESO Memorandum Report No. 9729.
U.S. Navy. 1998. F404-GE-400 Engine Fuel Flow and Emission Indexes By Percentage of Core RPM (%N2) - Draft - Revised. (AESO Memo Report No. 9734A).



AIRCRAFT SUPPORT EQUIPMENT EMISSIONS ANALYSIS

TABLE E-56. ENGINE-POWERED SUPPORT EQUIPMENT FOR F/A-18 AIRCRAFT SQUADRONS

EQUIPMENT DESIGNATION	EXISTING ITEMS	ADDED ITEMS PHASE 1	PHASE 2	FUEL	ENGINE SIZE	ITEM DESCRIPTION	PURPOSE OR USE OF ITEM	USE CATEGORY
A/S32A-42	27	12	12	JP-5	80 hp	Small tow tractor	Moving aircraft and equipment	routine use
A/S32A-30A	5	0	0	Diesel	164 hp	Standard tow tractor	Moving aircraft and equipment	routine use
A/S32A-30/32A	29	12	12	Gasoline	150 hp	Standard tow tractor	Moving aircraft and equipment	routine use
JG-40PT-16	19	8	12	Gasoline	125 hp	Medium tow tractor	Moving aircraft and equipment	routine use
TA-35	1	0	0	JP-5	192 hp	Large tow tractor	Moving aircraft and equipment	routine use
TA-75A/B	19	8	12	Gasoline	210 hp	Large tow tractor	Moving aircraft and equipment	routine use
HLU-196BE	43	16	24	Gasoline	3 hp	Bomb hoist	Hydraulic lift for aircraft armament	routine use
A/M27T-5	10	5	6	JP-5	95 hp	Hydraulic test stand	For service and maintenance of aircraft hydraulic systems	routine use
A/M27T-7	10	5	6	JP-5	90 hp	Hydraulic test stand	For service and maintenance of aircraft hydraulic systems	routine use
NC-10C MEPP	10	10	12	Diesel	220 hp	Towable generator (120/220 Vac, 28 Vdc)	Electrical power for starting or servicing aircraft engines	standby only
GTCP 100-85	8	8	12	JP-5	400 hp	Air start unit	Electrical power and air for starting aircraft engines	standby only
A/M32C-17	8	8	12	JP-5	232 hp	Air conditioning unit	Air for cooling and ventilating aircraft cockpit or electrical equipment	standby only
Blower	2	0	0	Gasoline	5 hp	Blower for lift bag	Inflating lift bags under damaged equipment	emergency use only
A/M42M-2	12	6	6	Gasoline	8 hp	Floodlight set	Emergency or temporary lighting and 120 Vac or 28 Vdc power	standby only
BT-400	1	0	0	JP-5	6.5 hp	Heater		standby only
LD70204	1	0	0	JP-5	80 hp	De-icer	De-icing aircraft	standby only

TABLE E-56. ENGINE-POWERED SUPPORT EQUIPMENT FOR F/A-18 AIRCRAFT SQUADRONS

Notes: hp = horsepower

Equipment identifications and the existing number of items at NAS Lemoore provided by COMNAVAIRPAC and NAS Lemoore personnel.

Existing equipment items are for existing F/A-18C/D aircraft squadrons at NAS Lemoore.

Estimated equipment additions are based on identified additions or existing equipment stocking rates, whichever is larger.

Phase 1 equipment additions are for F/A-18E/F squadrons, and apply to both the NAS Lemoore and NAF El Centro alternatives.

Phase 2 equipment additions apply only to F/A-18E/F squadrons under the NAF El Centro Alternative.

Phase 1 and Phase 2 tow tractor additions are based on 2 tractors of each size category per fleet squadron, plus 4 small and 4 standard tow tractors per FRS squadron.

Phase 1 and Phase 2 bomb hoist additions are based on 4 per fleet squadron.

Phase 1 and Phase 2 hydraulic test stand additions are based on 1 of each type per aircraft squadron (fleet plus FRS).

Phase 1 and Phase 2 NC-10C generator additions are based on 2 per aircraft squadron (fleet plus FRS).

Phase 1 and Phase 2 air start and air conditioning unit additions are based on 2 per fleet squadron.

Phase 1 and Phase 2 floodlight set additions are based on 1 per fleet squadron and 2 per FRS squadron.

The proposed action would not add any standard airfield equipment (lift bag blowers, heaters, or deicers).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions From NAS Lemoore "Huffers" and TSE.

Miller, Kent, LCDR. 1998. 2-23-98 E-Mail, AIMD Support Equipment Increases.

Shubert, Chris. 1998. 2-24-98 Fax, Support Equipment for Existing F/A-18 Squadrons at NAS Lemoore.

TABLE E-57. ESTIMATED EMISSIONS FROM AIRCRAFT SUPPORT EQUIPMENT USED BY ADDED F/A-18E/F AIRCRAFT

EQUIPMENT TYPE	ENGINE FUEL	TYPICAL IN-USE HP LOAD RATING	NUMBER OF ITEMS	ESTIMATED CUMULATIVE ANNUAL USE (hours)	Emission Rate (grams per horsepower-hour)					Total Emissions from Annual Equipment Use (tons/year)				
					Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
PHASE 1 ADDED AIRCRAFT (ALL ALTERNATIVES)														
TA-75 Tow Tractors (210 hp)	Gasoline	84	8	3,328	12.22	5.16	258.70	0.27	0.06	3.77	1.59	79.72	0.08	0.02
A/S32A-30/32A Tow Tractors (150 hp)	Gasoline	60	12	4,992	12.22	5.16	258.70	0.27	0.06	4.03	1.70	85.41	0.09	0.02
JG-40 Tow Tractors (125 hp)	Gasoline	50	8	3,328	12.22	5.16	258.70	0.27	0.06	2.24	0.95	47.45	0.05	0.01
A/S32A-42 Tow Tractors (80 hp)	JP-5	32	12	4,992	1.76	13.16	6.06	0.10	1.62	0.31	2.32	1.07	0.02	0.28
Bomb Hoists (3 hp)	Gasoline	3	16	1,664	12.22	5.16	258.70	0.27	0.06	0.07	0.03	1.42	0.00	0.00
A/M27T-5 Hydraulic Test Stand (95 hp)	JP-5	81	5	520	1.25	13.12	3.03	0.10	1.01	0.06	0.61	0.14	0.00	0.05
A/M27T-7 Hydraulic Test Stand (90 hp)	JP-5	77	5	520	1.25	13.12	3.03	0.10	1.01	0.06	0.58	0.13	0.00	0.04
GTCP 100 Series Air Start Units (400 hp)	JP-5	400	8	640	1.25	13.12	3.03	0.10	1.01	0.35	3.70	0.86	0.03	0.29
A/M32C-17 Air Conditioning Units (232 hp)	JP-5	232	8	96	1.25	13.12	3.03	0.10	1.01	0.03	0.32	0.07	0.00	0.02
Generators and Other Standby Items (220 hp)	Diesel	88	10	240	1.14	14.06	3.03	0.93	1.00	0.03	0.33	0.07	0.02	0.02
PHASE 1 TOTALS, NAS LEMOORE AND NAF EL CENTRO ALTERNATIVES										10.94	12.13	216.35	0.30	0.76

TABLE E-57. ESTIMATED EMISSIONS FROM AIRCRAFT SUPPORT EQUIPMENT USED BY ADDED F/A-18E/F AIRCRAFT

EQUIPMENT TYPE	ENGINE FUEL	TYPICAL IN-USE HP LOAD RATING	NUMBER OF ITEMS	ESTIMATED CUMULATIVE ANNUAL USE (hours)	Emission Rate (grams per horsepower-hour): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Total Emissions from Annual Equipment Use (tons/year): Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
PHASE 2 ADDED AIRCRAFT (NAF EL CENTRO ALTERNATIVE)														
TA-75 Tow Tractors (210 hp)	Gasoline	84	12	4,992	12.22	5.16	258.70	0.27	0.06	5.65	2.39	119.58	0.12	0.03
A/S32A-30/32A Tow Tractors (150 hp)	Gasoline	60	12	4,992	12.22	5.16	258.70	0.27	0.06	4.03	1.70	85.41	0.09	0.02
JG-40 Tow Tractors (125 hp)	Gasoline	50	12	4,992	12.22	5.16	258.70	0.27	0.06	3.36	1.42	71.18	0.07	0.02
A/S32A-42 Tow Tractors (80 hp)	JP-5	32	12	4,992	1.76	13.16	6.06	0.10	1.62	0.31	2.32	1.07	0.02	0.28
Bomb Hoists (3 hp)	Gasoline	3	24	2,496	12.22	5.16	258.70	0.27	0.06	0.10	0.04	2.14	0.00	0.00
A/M27T-5 Hydraulic Test Stand (95 hp)	JP-5	81	6	624	1.25	13.12	3.03	0.10	1.01	0.07	0.73	0.17	0.01	0.06
A/M27T-7 Hydraulic Test Stand (90 hp)	JP-5	77	6	624	1.25	13.12	3.03	0.10	1.01	0.07	0.69	0.16	0.01	0.05
GTCP 100 Series Air Start Units (400 hp)	JP-5	400	12	960	1.25	13.12	3.03	0.10	1.01	0.53	5.55	1.28	0.04	0.43
A/M32C-17 Air Conditioning Units (232 hp)	JP-5	232	12	144	1.25	13.12	3.03	0.10	1.01	0.05	0.48	0.11	0.00	0.04
Generators and Other Standby Items (220 hp)	Diesel	88	12	288	1.14	14.06	3.03	0.93	1.00	0.03	0.39	0.08	0.03	0.03
PHASE 2 INCREMENT, NAF EL CENTRO ALTERNATIVE ONLY										14.20	15.72	281.18	0.39	0.95
PHASE 2 TOTAL, NAF EL CENTRO ALTERNATIVE ONLY										25.14	27.85	497.53	0.69	1.71

Notes: hp = horsepower

Equipment identifications, number of items, engine sizes, fuel types, and use data provided by Navy personnel; see also Table E-56.

In use horsepower load values were rounded from rated horsepower times typical load factors of 40% for tow tractors, 100% for bomb hoists, air start units, and air conditioning units; 85% for hydraulic test stands; and 40% for other standby equipment.

Load factors were selected to produce reasonable in-use load ratings for the equipment type and its normal use, using typical in-use horsepower load data from U.S. Environmental Protection Agency (1991) as comparison values.

Tow tractor use estimates are based on 8 hours per week per tow tractor.

Bomb hoist use estimates are based on 2 hours per week per hoist.

Hydraulic test stand use estimates are based on 2 hours per week per test stand.

Air start unit use estimates are based on 80 hours per year per unit.

Air conditioning unit use estimates are based on 1 hour per month per unit.

Testing and use of generators and other standby equipment is based on 2 hour per month for the equivalent of 10 items rated at 220 hp, 40% load factor (1,760 horsepower-hours per month).

Emission rates for gasoline-fueled tow tractors are from U.S. Environmental Protection Agency (1991), including EPA in-use adjustments.

Emission rates for tow tractors operating on JP-5 fuel are based on diesel equipment emission rates from U.S. Environmental Protection Agency (1991), multiplied by a JP-5 adjustment factor (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

Emission rates for portable diesel engine equipment operated on JP-5 fuel are based on diesel emission rates (U.S. Environmental Protection Agency, 1995) multiplied by a JP-5 adjustment factor (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

The sulfur oxide emission rate for tow tractors and portable equipment using JP-5 fuel is based on manufacturer data for 80 horsepower hydraulic test stand equipment (Castro 1997).

Emission rates for portable equipment using diesel engines are from U.S. Environmental Protection Agency 1995, Section 3.3.

Phase 1 totals apply to all alternatives, and will continue during Phase 2.

Phase 2 totals apply only to the NAF El Centro Alternative; both the incremental increase above Phase 1 and the overall Phase 2 totals are shown.

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions From NAS Lemoore "Huffers" and TSE.

Miller, Kent, LCDR. 1998. 2-23-98 E-Mail, AIMD Support Equipment Increases.

Shubert, Chris. 1998. 2-24-98 Fax, Support Equipment for Existing F/A-18 Squadrons at NAS Lemoore.

U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emission Study - Report. (ANR-443). (NTIS # PB92126960).

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

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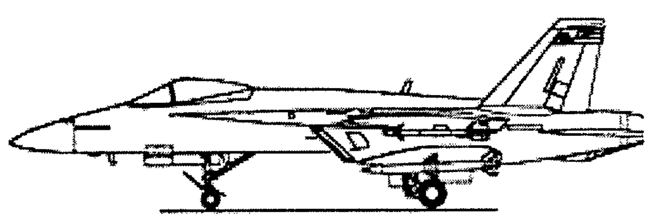

MISCELLANEOUS MOBILE AND STATIONARY SOURCES EMISSIONS ANALYSIS

TABLE E-58. EMISSION RATES FOR MISCELLANEOUS STATIONARY AND MOBILE SOURCES

SOURCE CATEGORY	TYPICAL SIZE OR QUANTITY	SIZE UNITS	STANDARD EMISSION FACTORS					EMISSION FACTOR UNITS	EMISSION FACTOR DATA SOURCE
			ROG	NOx	CO	SOx	PM10		
JP-5 AIRCRAFT FUEL TRANSFERS, 40 F	1	MILLION GALLONS	19.26	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 40 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 50 F	1	MILLION GALLONS	27.63	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 50 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 60 F	1	MILLION GALLONS	38.39	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 60 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 70 F	1	MILLION GALLONS	48.75	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 70 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 80 F	1	MILLION GALLONS	65.24	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 80 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 90 F	1	MILLION GALLONS	89.68	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 90 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 100 F	1	MILLION GALLONS	121.63	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 100 DEG F
NATURAL GAS BOILER, HANGAR	6.3	MILLION BTU/HR	3.83	81.00	61.00	0.60	12.00	LBS/MILLION SCF	AP-42, SECT 1.4 (<10 MMBTU, LOW NOx)
NATURAL GAS BOILER, BEQ	4.2	MILLION BTU/HR	3.83	81.00	61.00	0.60	12.00	LBS/MILLION SCF	AP-42, SECT 1.4 (<10 MMBTU, LOW NOx)
OFFICE/SHOP BLDG NATURAL GAS USE	1	MILLION BTU/HR	3.83	81.00	61.00	0.60	12.00	LBS/MILLION SCF	AP-42, SECT 1.4 (<10 MMBTU, LOW NOx)
RESIDENTIAL NATURAL GAS USE	1	MILLION BTU/HR	7.26	94.00	40.00	0.60	11.18	LBS/MILLION SCF	AP-42, SECT 1.4 (RESIDENTIAL)
ON-BASE SERVICE STATION	1	THOUSAND GAL/YR	1.70	0.00	0.00	0.00	0.00	LBS/1000 GALLONS	NAS LEMOORE TITLE V TRACKING REPORT
AIRCRAFT PAINTING	3.4	GALLONS/YR/PLANE	3.51	0.00	0.00	0.00	0.00	LBS/GALLON PAINT	ASSUME 420 GRAMS VOC/LITER
SOLVENT USE	1.8	GALLONS/YR/PLANE	7.36	0.00	0.00	0.00	0.00	LBS/GAL SOLVENT	ASSUME 7.36 LB/GALLON, 100% VOLATILE
ABRASIVE BLASTING	68.1	POUNDS/YR/PLANE	0.00	0.00	0.00	0.00	0.01	LBS/LB ABRASIVE	NAS LEMOORE TITLE V TRACKING REPORT

TABLE E-58. EMISSION RATES FOR MISCELLANEOUS STATIONARY AND MOBILE SOURCES

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

TABLE E-59. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEAR 2000

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, PARTIAL FRS	7.34	MILLION GAL/YEAR	0.151	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 1 FLEET	2.68	MILLION GAL/YEAR	0.055	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, BEQ	1.84	MILLION SCF/YEAR	0.004	0.075	0.056	0.001	0.011	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	880	SCF GAS/YEAR	2E-06	4E-05	3E-05	3E-07	5E-06	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	2,400	SCF GAS/YEAR	9E-06	1E-04	5E-05	7E-07	1E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	8,692	SCF GAS/YEAR	3E-05	4E-04	2E-04	3E-06	5E-05	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	223.9	THOUSAND GAL/YEAR	0.190	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	115.6	GALLONS/YEAR	0.203	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	61.2	GALLONS/YEAR	0.225	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	2,315	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.012	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.206	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			0.622	0.075	0.056	0.001	0.023	
OFF-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	

TABLE E-59. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEAR 2000

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAS Lemoore from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 700 off-base units assumed for the end of Phase 1.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from Castro (1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from Castro (1997b) and 160 aircraft currently based at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-32.

Calendar year assumptions for new building construction are presented in Table E-1; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-60. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEAR 2001

SOURCE CATEGORY	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					USE RATE ASSUMPTIONS
	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.272	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 2 FLEET	5.35	MILLION GAL/YEAR	0.110	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, BEQs	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	1,136	SCF GAS/YEAR	2E-06	5E-05	3E-05	3E-07	7E-06	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	4,800	SCF GAS/YEAR	2E-05	2E-04	1E-04	1E-06	3E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	16,362	SCF GAS/YEAR	6E-05	8E-04	3E-04	5E-06	9E-05	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	421.4	THOUSAND GAL/YEAR	0.358	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	217.6	GALLONS/YEAR	0.381	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	115.2	GALLONS/YEAR	0.424	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	4,358	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.022	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.382	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.171	0.149	0.112	0.001	0.044	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	

TABLE E-60. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEAR 2001

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAS Lemoore from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 700 off-base units assumed for the end of Phase 1.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from Castro (1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from Castro (1997b) and 160 aircraft currently based at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-32.

Calendar year assumptions for new building construction are presented in Table E-1; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

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WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-61. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEAR 2002

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.272	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 3 FLEET	8.03	MILLION GAL/YEAR	0.165	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, BEQs	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	1,295	SCF GAS/YEAR	2E-06	5E-05	4E-05	4E-07	8E-06	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	7,200	SCF GAS/YEAR	3E-05	3E-04	1E-04	2E-06	4E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	19,941	SCF GAS/YEAR	7E-05	9E-04	4E-04	6E-06	1E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	513.6	THOUSAND GAL/YEAR	0.437	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	265.2	GALLONS/YEAR	0.465	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	140.4	GALLONS/YEAR	0.517	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	5,312	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.027	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.437	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.425	0.149	0.112	0.001	0.049	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	

TABLE E-61. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEAR 2002

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

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Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

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Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 700 off-base units assumed for the end of Phase 1.

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Emission rate from on-base gasoline sales based on data from Castro (1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from Castro (1997b) and 160 aircraft currently based at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-32.

Calendar year assumptions for new building construction are presented in Table E-1; construction is assumed to occur the year prior to building use.

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Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-62. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEARS 2003 - 2010

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.272	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 4 FLEET	10.70	MILLION GAL/YEAR	0.220	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, BEQs	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	1,295	SCF GAS/YEAR	2E-06	5E-05	4E-05	4E-07	8E-06	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	9,576	SCF GAS/YEAR	3E-05	5E-04	2E-04	3E-06	5E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	23,520	SCF GAS/YEAR	9E-05	1E-03	5E-04	7E-06	1E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	605.8	THOUSAND GAL/YEAR	0.515	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	312.8	GALLONS/YEAR	0.548	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	165.6	GALLONS/YEAR	0.609	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	6,265	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.031	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.492	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.680	0.149	0.112	0.001	0.053	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	

TABLE E-62. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE, YEARS 2003 - 2010

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAS Lemoore from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 700 off-base units assumed for the end of Phase 1.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from Castro (1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from Castro (1997b) and 160 aircraft currently based at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-32.

Calendar year assumptions for new building construction are presented in Table E-1; construction is assumed to occur the year prior to building use.

Emission reductions due to elimination of 26 F/A-18C/D FRS squadron aircraft (aircraft refueling, paint and solvent use, abrasive blasting) ignored for Phase 2.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-63. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2000

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, PARTIAL FRS	7.34	MILLION GAL/YEAR	0.223	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 1 FLEET	2.68	MILLION GAL/YEAR	0.081	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	2.76	MILLION SCF/YEAR	0.005	0.112	0.084	0.001	0.017	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	1.84	MILLION SCF/YEAR	0.004	0.075	0.056	0.001	0.011	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	1,458	SCF GAS/YEAR	3E-06	6E-05	4E-05	4E-07	9E-06	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	2,400	SCF GAS/YEAR	9E-06	1E-04	5E-05	7E-07	1E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	8,133	SCF GAS/YEAR	3E-05	4E-04	2E-04	2E-06	5E-05	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	223.9	THOUSAND GAL/YEAR	0.190	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	115.6	GALLONS/YEAR	0.203	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	61.2	GALLONS/YEAR	0.225	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	2,315	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.012	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.305	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			0.627	0.186	0.140	0.001	0.039	
OFF-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	

TABLE E-63. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2000

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-64. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2001

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 2 FLEET	5.35	MILLION GAL/YEAR	0.163	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	2.76	MILLION SCF/YEAR	0.005	0.112	0.084	0.001	0.017	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	2,878	SCF GAS/YEAR	6E-06	1E-04	9E-05	9E-07	2E-05	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	4,800	SCF GAS/YEAR	2E-05	2E-04	1E-04	1E-06	3E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	15,310	SCF GAS/YEAR	6E-05	7E-04	3E-04	5E-06	9E-05	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	421.4	THOUSAND GAL/YEAR	0.358	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	217.6	GALLONS/YEAR	0.381	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	115.2	GALLONS/YEAR	0.424	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	4,358	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.022	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.564	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.176	0.261	0.196	0.002	0.060	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	

TABLE E-64. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2001

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-65. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2002

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 3 FLEET	8.03	MILLION GAL/YEAR	0.244	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	2.76	MILLION SCF/YEAR	0.005	0.112	0.084	0.001	0.017	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	3,051	SCF GAS/YEAR	6E-06	1E-04	9E-05	9E-07	2E-05	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	7,200	SCF GAS/YEAR	3E-05	3E-04	1E-04	2E-06	4E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	18,659	SCF GAS/YEAR	7E-05	9E-04	4E-04	6E-06	1E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	513.6	THOUSAND GAL/YEAR	0.437	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	265.2	GALLONS/YEAR	0.465	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	140.4	GALLONS/YEAR	0.517	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	5,312	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.027	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.646	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.000	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.430	0.261	0.196	0.002	0.065	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	

TABLE E-65. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2002

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-66. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEARS 2003, 2004

SOURCE CATEGORY	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					USE RATE ASSUMPTIONS
	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 4 FLEET	10.70	MILLION GAL/YEAR	0.325	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	2.76	MILLION SCF/YEAR	0.005	0.112	0.084	0.001	0.017	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	3,139	SCF GAS/YEAR	6E-06	1E-04	1E-04	9E-07	2E-05	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	9,600	SCF GAS/YEAR	3E-05	5E-04	2E-04	3E-06	5E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	22,008	SCF GAS/YEAR	8E-05	1E-03	4E-04	7E-06	1E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	605.8	THOUSAND GAL/YEAR	0.515	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	312.8	GALLONS/YEAR	0.548	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	165.6	GALLONS/YEAR	0.609	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	6,265	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.031	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.727	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.685	0.261	0.196	0.002	0.070	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	

TABLE E-66. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEARS 2003, 2004

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-67. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2005

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 5 FLEET	12.99	MILLION GAL/YEAR	0.395	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	2.76	MILLION SCF/YEAR	0.005	0.112	0.084	0.001	0.017	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	3,139	SCF GAS/YEAR	6E-06	1E-04	1E-04	9E-07	2E-05	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	9,600	SCF GAS/YEAR	3E-05	5E-04	2E-04	3E-06	5E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	28,986	SCF GAS/YEAR	1E-04	1E-03	6E-04	9E-06	2E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	692.2	THOUSAND GAL/YEAR	0.588	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	353.6	GALLONS/YEAR	0.620	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	187.2	GALLONS/YEAR	0.689	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	7,082	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.035	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.797	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			1.909	0.261	0.196	0.002	0.074	
OFF-BASE NATURAL GAS USE			0.000	0.001	0.001	0.000	0.000	

TABLE E-67. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2005

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-68. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2006

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 6 FLEET	15.29	MILLION GAL/YEAR	0.465	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	5.52	MILLION SCF/YEAR	0.011	0.224	0.168	0.002	0.033	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	3.68	MILLION SCF/YEAR	0.007	0.149	0.112	0.001	0.022	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	7,897	SCF GAS/YEAR	2E-05	3E-04	2E-04	2E-06	5E-05	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	11,400	SCF GAS/YEAR	4E-05	5E-04	2E-04	3E-06	6E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	35,963	SCF GAS/YEAR	1E-04	2E-03	7E-04	1E-05	2E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	778.5	THOUSAND GAL/YEAR	0.662	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	394.4	GALLONS/YEAR	0.691	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	208.8	GALLONS/YEAR	0.768	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	7,900	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.039	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.867	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.001	0.000	0.000	0.000	
ON-BASE PERMIT SOURCES			2.139	0.373	0.281	0.003	0.095	
OFF-BASE NATURAL GAS USE			0.000	0.002	0.001	0.000	0.000	

TABLE E-68. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2006

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

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U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-69. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2007

SOURCE CATEGORY	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					USE RATE ASSUMPTIONS
	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 7 FLEET	17.58	MILLION GAL/YEAR	0.535	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	5.52	MILLION SCF/YEAR	0.011	0.224	0.168	0.002	0.033	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	5.52	MILLION SCF/YEAR	0.011	0.224	0.168	0.002	0.033	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	12,381	SCF GAS/YEAR	2E-05	5E-04	4E-04	4E-06	7E-05	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	13,200	SCF GAS/YEAR	5E-05	6E-04	3E-04	4E-06	7E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	42,941	SCF GAS/YEAR	2E-04	2E-03	9E-04	1E-05	2E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	864.8	THOUSAND GAL/YEAR	0.735	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	435.2	GALLONS/YEAR	0.763	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	230.4	GALLONS/YEAR	0.848	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	8,717	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.044	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			0.936	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.001	0.001	0.000	0.000	
ON-BASE PERMIT SOURCES			2.367	0.447	0.337	0.003	0.110	
OFF-BASE NATURAL GAS USE			0.000	0.002	0.001	0.000	0.000	

TABLE E-69. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2007

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

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WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-70. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2008

SOURCE CATEGORY	USE INDEX AMOUNT	USE INDEX UNITS	ANNUAL EMISSIONS, TONS/YEAR ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 8 FLEET	19.87	MILLION GAL/YEAR	0.604	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	5.52	MILLION SCF/YEAR	0.011	0.224	0.168	0.002	0.033	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	7.36	MILLION SCF/YEAR	0.014	0.298	0.224	0.002	0.044	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	32,690	SCF GAS/YEAR	6E-05	1E-03	1E-03	1E-05	2E-04	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	15,000	SCF GAS/YEAR	5E-05	7E-04	3E-04	5E-06	8E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	49,918	SCF GAS/YEAR	2E-04	2E-03	1E-03	1E-05	3E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	951.2	THOUSAND GAL/YEAR	0.809	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	476.0	GALLONS/YEAR	0.834	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	252.0	GALLONS/YEAR	0.927	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	9,534	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.048	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			1.006	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.002	0.001	0.000	0.000	
ON-BASE PERMIT SOURCES			2.595	0.522	0.393	0.004	0.125	
OFF-BASE NATURAL GAS USE			0.000	0.002	0.001	0.000	0.000	

TABLE E-70. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2008

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

Castro, Tim. 1997a. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE. Fax sent by Tim Castro, NAS Lemoore.

Castro, Tim. 1997b. 10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout. Fax sent by Tim Castro, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).

WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE E-71. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2009

SOURCE CATEGORY	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					USE RATE ASSUMPTIONS
	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 9 FLEET	22.16	MILLION GAL/YEAR	0.674	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	5.52	MILLION SCF/YEAR	0.011	0.224	0.168	0.002	0.033	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	7.36	MILLION SCF/YEAR	0.014	0.298	0.224	0.002	0.044	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	32,881	SCF GAS/YEAR	6E-05	1E-03	1E-03	1E-05	2E-04	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	16,800	SCF GAS/YEAR	6E-05	8E-04	3E-04	5E-06	9E-05	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	56,896	SCF GAS/YEAR	2E-04	3E-03	1E-03	2E-05	3E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	1,037.5	THOUSAND GAL/YEAR	0.882	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	516.8	GALLONS/YEAR	0.906	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	273.6	GALLONS/YEAR	1.007	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	10,351	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.052	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			1.076	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.002	0.001	0.000	0.000	
ON-BASE PERMIT SOURCES			2.819	0.522	0.393	0.004	0.129	
OFF-BASE NATURAL GAS USE			0.000	0.003	0.001	0.000	0.000	

TABLE E-71. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2009

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

Aircraft refueling emissions estimated for splash loading processes according to U.S. Environmental Protection Agency (1995). Fuel pit refueling requires only one fuel transfer (underground tank to aircraft). Fuel truck refueling requires two fuel transfers (underground tank to truck, truck to aircraft).

Aircraft refueling estimated to be 80% from fuel pit and 20% from fuel trucks (consistent with hot refueling factor).

Monthly temperature patterns for NAF El Centro from WeatherDisc Associates (1990); see Table E-73.

Natural gas boilers for BEQ facilities assumed to be low-NOx commercial units with typical sizes based on data from Castro (1997b): one 8.4 million BTU/hour boiler for every two BEQs (about 300 spaces each).

Emission estimates for natural gas boilers based on data from U.S. Environmental Protection Agency (1995), assuming operation at 5% of rated capacity (actual NAS Lemoore natural gas use versus boiler capacity, based on data from Castro, 1997b).

Emission estimates for other natural gas use in nonresidential buildings based on low-NOx commercial systems (U.S. Environmental Protection Agency, 1995) and a natural gas requirement of 10 BTU per year per square foot of building space.

Emission estimates for natural gas use in on-base family housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 20 BTU per year per square foot of building space, and 1,200 square feet per family housing unit.

Emission estimates for natural gas use in off-base housing based on residential systems (U.S. Environmental Protection Agency, 1995), a natural gas requirement of 24 BTU per year per square foot of building space, and 1,400 square feet per family housing unit; 655 off-base units for Phase 1, 1,246 units for Phase 2.

The heating value of natural gas is assumed to be 1,000 BTU per standard cubic foot.

Natural gas requirements for different building types based on building type energy budgets (Hunn, 1996), assuming that natural gas furnishes about 30% of nonresidential building energy and about 50% of residential building energy.

On-base gasoline sales based on NAS Lemoore Navy exchange sales volume (Castro, 1997b) and current military employment at NAS Lemoore.

Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

Per aircraft use of paints, solvents, and abrasive blasting media based on data from NAS Lemoore (Castro, 1997b) and 160 aircraft currently at NAS Lemoore.

Emissions from aircraft painting operations assumes volatile ogranic content of 420 grams per liter.

Emissions from solvent use assumes 100% volatile organic compound content.

Emissions from abrasive blasting activities based on emission rate in Castro (1997b).

Calendar year assumptions for aircraft arrivals and flight operations are presented in Table E-33.

Calendar year assumptions for new building construction are presented in Table E-10; construction is assumed to occur the year prior to building use.

Data Sources:

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TABLE E-72. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2010

	USE INDEX		ANNUAL EMISSIONS, TONS/YEAR					
SOURCE CATEGORY	AMOUNT	UNITS	ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
AIRCRAFT REFUELING, FULL FRS	13.21	MILLION GAL/YEAR	0.402	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
AIRCRAFT REFUELING, 10 FLEET	24.46	MILLION GAL/YEAR	0.744	0.000	0.000	0.000	0.000	80% FUEL PIT, 20% TRUCK REFUELING
NATURAL GAS BOILER, HANGAR	5.52	MILLION SCF/YEAR	0.011	0.224	0.168	0.002	0.033	5% OF RATED 6.3 MILLION BTU/HR CAPACITY
NATURAL GAS BOILER FOR BEQ, BOQ	7.36	MILLION SCF/YEAR	0.014	0.298	0.224	0.002	0.044	5% OF RATED 4.2 MILLION BTU/HR CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	32,881	SCF GAS/YEAR	6E-05	1E-03	1E-03	1E-05	2E-04	10 BTU/YR/SF, 1000 BTU/SCF HEAT VALUE
NATURAL GAS USE, ON-BASE HOUSING	18,600	SCF GAS/YEAR	7E-05	9E-04	4E-04	6E-06	1E-04	20 BTU/YR/SF, 1200 SF/DU, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	63,874	SCF GAS/YEAR	2E-04	3E-03	1E-03	2E-05	4E-04	24 BTU/YR/SF, 1400 SF/DU, 1000 BTU/SCF
ON-BASE SERVICE STATION	1,123.9	THOUSAND GAL/YEAR	0.955	0.000	0.000	0.000	0.000	326.42 GAL/YEAR PER MILITARY EMPLOYEE
AIRCRAFT PAINTING	557.6	GALLONS/YEAR	0.977	0.000	0.000	0.000	0.000	3.4 GALLONS/YEAR PER ADDED AIRCRAFT
SOLVENT USE	295.2	GALLONS/YEAR	1.086	0.000	0.000	0.000	0.000	1.8 GALLONS/YEAR PER ADDED AIRCRAFT
ABRASIVE BLASTING	11,168	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.056	67.3 POUNDS PER YEAR PER ADDED AIRCRAFT
AIRCRAFT REFUELING			1.146	0.000	0.000	0.000	0.000	
ON-BASE NATURAL GAS USE			0.000	0.002	0.001	0.000	0.000	
ON-BASE PERMIT SOURCES			3.043	0.522	0.393	0.004	0.133	
OFF-BASE NATURAL GAS USE			0.000	0.003	0.001	0.000	0.000	

TABLE E-72. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE, YEAR 2010

Notes:

FRS squadron fuel requirements estimated at 11,009,160 gallons per year and fleet squadron fuel requirements estimated as 2,229,220 gallons per squadron per year, based on information provided by E/F FIT team personnel at NAS Lemoore.

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Emission rate from on-base gasoline sales based on data from NAS Lemoore (Castro, 1997b).

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TABLE E-73. MONTHLY TEMPERATURE PATTERNS USED TO ESTIMATE JET FUEL VOLATILITY

		MONTHLY MEAN AIR TEMPERATURE VALUES, DEGREES FAHRENHEIT												
LOCATION	PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
NAS LEMOORE	MEAN MAX	54	61	67	75	83	90	99	97	91	80	65	55	76
	MEAN MIN	34	39	40	46	51	56	63	61	57	50	40	37	48
	MIDPOINT	44	50	53.5	60.5	67	73	81	79	74	65	52.5	46	62
TEMP FOR JP-5 VOLATILITY:		40	50	50	60	70	70	80	80	70	70	50	50	
NAF EL CENTRO	MEAN MAX	68	73	77	86	93	101	107	106	103	91	78	70	88
	MEAN MIN	43	47	51	58	64	71	79	78	74	63	50	44	60
	MIDPOINT	55.5	60	64	72	78.5	86	93	92	88.5	77	64	57	74
TEMP FOR JP-5 VOLATILITY:		60	60	60	70	80	90	90	90	90	80	60	60	

Data Source:
WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

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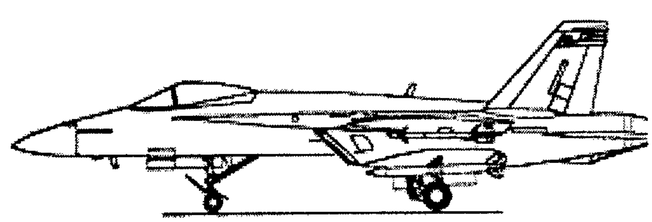

VEHICLE EMISSION RATE PARAMETERS, ON-BASE HOUSING

TABLE E-74. GENERALIZED VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES FOR ON-BASE HOUSING

		DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS										
TRIP TYPE	PORTION OF TOTAL TRIPS	UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
WORK	30.00%	45.00%	30.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SHOPPING	35.00%	50.00%	20.00%	15.00%	5.00%	3.00%	2.00%	1.00%	1.00%	1.00%	1.00%	1.00%
OTHER	35.00%	20.00%	15.00%	25.00%	15.00%	10.00%	7.00%	3.00%	2.00%	1.00%	1.00%	1.00%
SUM/MEAN	100.00%	38.00%	21.25%	20.00%	7.00%	4.55%	3.15%	1.40%	1.05%	0.70%	0.70%	0.70%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
WORK	7.68	84.65%	7.22%	8.13%	73.54%	18.34%	85.10%	6.77%
SHOPPING	10.78	43.90%	40.30%	15.81%	28.30%	55.90%	44.53%	39.66%
OTHER	15.65	44.46%	21.53%	34.01%	28.63%	37.36%	45.11%	20.89%
MEANS	11.55	56.32%	23.81%	19.87%	41.98%	38.14%	56.90%	23.22%

TABLE E-75. EMFAC7F INPUT DATA, TRIPS FROM NAS LEMOORE ON-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 85 WINTER: 40

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	60	64	70	86	94	100
WINTER	35	35	37	43	49	50

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	84.65%	7.22%	8.13%	100.0%	0.0%	0.0%
H-S	43.90%	40.30%	15.80%	0.0%	100.0%	0.0%
H-O	44.46%	21.53%	34.01%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	84.65%	7.22%	8.13%			
SHOP	43.90%	40.30%	15.80%			
OTHER	44.46%	21.53%	34.01%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips (see 3 category mix)
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips (see 3 category mix)

TABLE E-76. 1999 EMISSION RATES, NAS LEMOORE ON-BASE HOUSING

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.88	1.31	1.15	1.06	1.09
	SHOP	1.59	1.02	0.85	0.76	0.79
	OTHER	1.56	0.99	0.82	0.73	0.76
NOx	WORK	1.25	1.08	1.07	1.19	1.48
	SHOP	1.10	0.93	0.92	1.04	1.33
	OTHER	1.04	0.87	0.86	0.98	1.26
CO-S	WORK	14.84	12.65	11.67	11.21	11.74
	SHOP	11.77	9.58	8.59	8.14	8.67
	OTHER	11.28	9.09	8.11	7.65	8.18
CO-W	WORK	32.88	30.27	29.09	28.54	29.16
	SHOP	20.98	18.37	17.19	16.63	17.26
	OTHER	20.98	18.37	17.19	16.64	17.26
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20

	SOAK	DRNL/RSTL	ROAD DUST
WORK	0.50	6.43	2.90
SHOP	0.50	6.43	2.90
OTHER	0.50	6.43	2.90

NOTES: WORK = home-work trips
SHOP = home-shopping trips
OTHER = home-other trips
ROG = reactive organic gases (summer fuel volatility)
NOx = oxides of nitrogen (summer fuel volatility)
CO-S = carbon monoxide (summer fuel volatility)
CO-W = carbon monoxide (winter fuel volatility)
PMEX = exhaust particulate matter
PMTW = tire wear particulate matter
DRNL = diurnal evaporative emissions (grams/veh-day)
RSTL = resting loss evaporative emissions (g/veh-day)
SOAK = hot soak emission rate in grams/trip
ROAD DUST = resuspended road dust (PM10 grams/vmt)

TABLE E-77. EMFAC7F INPUT DATA, TRIPS FROM NAF EL CENTRO ON-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 90 WINTER: 60

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	78	81	85	96	101	105
WINTER	45	45	48	59	68	70

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	84.65%	7.22%	8.13%	100.0%	0.0%	0.0%
H-S	43.90%	40.30%	15.80%	0.0%	100.0%	0.0%
H-O	44.46%	21.53%	34.01%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	84.65%	7.22%	8.13%			
SHOP	43.90%	40.30%	15.80%			
OTHER	44.46%	21.53%	34.01%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips (see 3 category mix)
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips (see 3 category mix)

TABLE E-78. 1999 EMISSION RATES, NAF EL CENTRO ON-BASE HOUSING

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.99	1.33	1.14	1.05	1.08
	SHOP	1.72	1.05	0.87	0.77	0.81
	OTHER	1.68	1.02	0.84	0.74	0.78
NOx	WORK	1.25	1.08	1.07	1.19	1.48
	SHOP	1.10	0.93	0.92	1.05	1.34
	OTHER	1.04	0.87	0.86	0.98	1.27
CO-S	WORK	15.16	12.83	11.79	11.30	11.87
	SHOP	12.26	9.93	8.88	8.40	8.96
	OTHER	11.70	9.37	8.33	7.84	8.41
CO-W	WORK	22.46	20.25	19.25	18.79	19.30
	SHOP	15.01	12.80	11.81	11.34	11.85
	OTHER	14.95	12.74	11.74	11.28	11.79
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20

	SOAK	DRNL/RSTL	ROAD DUST
WORK	0.50	8.11	2.90
SHOP	0.50	8.11	2.90
OTHER	0.50	8.11	2.90

NOTES: WORK = home-work trips
SHOP = home-shopping trips
OTHER = home-other trips
ROG = reactive organic gases (summer fuel volatility)
NOx = oxides of nitrogen (summer fuel volatility)
CO-S = carbon monoxide (summer fuel volatility)
CO-W = carbon monoxide (winter fuel volatility)
PMEX = exhaust particulate matter
PMTW = tire wear particulate matter
DRNL = diurnal evaporative emissions (grams/veh-day)
RSTL = resting loss evaporative emissions (g/veh-day)
SOAK = hot soak emission rate in grams/trip
ROAD DUST = resuspended road dust (PM10 grams/vmt)

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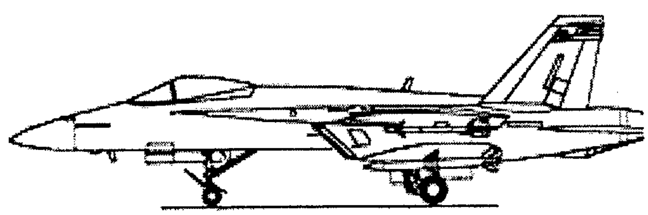


VEHICLE EMISSION RATE PARAMETERS, OFF-BASE HOUSING

TABLE E-79. VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES, OFF-BASE HOUSING AT NAS LEMOORE

		DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS										
TRIP TYPE	PORTION OF TOTAL TRIPS	UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
WORK	30.00%	15.00%	25.00%	17.00%	12.00%	15.00%	10.00%	1.00%	1.00%	2.00%	1.00%	1.00%
SHOPPING	35.00%	45.00%	20.00%	13.00%	5.00%	10.00%	2.00%	1.00%	1.00%	1.00%	1.00%	1.00%
OTHER	35.00%	20.00%	18.00%	25.00%	10.00%	15.00%	5.00%	1.00%	1.00%	3.00%	1.00%	1.00%
SUM/MEAN	100.00%	27.25%	20.80%	18.40%	8.85%	13.25%	5.45%	1.00%	1.00%	2.00%	1.00%	1.00%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
WORK	16.10	60.64%	5.17%	34.19%	52.68%	13.14%	60.96%	4.85%
SHOPPING	11.83	41.95%	38.51%	19.53%	27.04%	53.42%	42.56%	37.91%
OTHER	15.45	45.36%	21.96%	32.68%	29.20%	38.12%	46.02%	21.31%
MEANS	14.37	48.75%	22.72%	28.53%	35.49%	35.98%	49.29%	22.18%

TABLE E-80. EMFAC7F INPUT DATA, TRIPS FROM NAS LEMOORE OFF-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 85 WINTER: 40

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	60	64	70	86	94	100
WINTER	35	35	37	43	49	50

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	60.64%	5.17%	34.19%	100.0%	0.0%	0.0%
H-S	41.95%	38.51%	19.54%	0.0%	100.0%	0.0%
H-O	45.36%	21.96%	32.68%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	60.64%	5.17%	34.19%			
SHOP	41.95%	38.51%	19.54%			
OTHER	45.36%	21.96%	32.68%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips (see 3 category mix)
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips (see 3 category mix)

TABLE E-81. 1999 EMISSION RATES, NAS LEMOORE OFF-BASE HOUSING

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.67	1.10	0.93	0.84	0.87
	SHOP	1.57	1.00	0.83	0.74	0.77
	OTHER	1.57	1.00	0.83	0.74	0.77
NOx	WORK	1.08	0.91	0.91	1.03	1.31
	SHOP	1.08	0.91	0.90	1.03	1.31
	OTHER	1.04	0.87	0.87	0.99	1.27
CO-S	WORK	12.41	10.22	9.23	8.78	9.31
	SHOP	11.52	9.33	8.35	7.89	8.43
	OTHER	11.38	9.19	8.21	7.75	8.29
CO-W	WORK	25.68	23.06	21.88	21.33	21.95
	SHOP	20.38	17.77	16.59	16.04	16.66
	OTHER	21.25	18.64	17.46	16.91	17.53
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20

	SOAK	DRNL\RSTL	ROAD DUST
WORK	0.50	6.43	2.90
SHOP	0.50	6.43	2.90
OTHER	0.50	6.43	2.90

NOTES: WORK = home-work trips
SHOP = home-shopping trips
OTHER = home-other trips
ROG = reactive organic gases (summer fuel volatility)
NOx = oxides of nitrogen (summer fuel volatility)
CO-S = carbon monoxide (summer fuel volatility)
CO-W = carbon monoxide (winter fuel volatility)
PMEX = exhaust particulate matter
PMTW = tire wear particulate matter
DRNL = diurnal evaporative emissions (grams/veh-day)
RSTL = resting loss evaporative emissions (g/veh-day)
SOAK = hot soak emission rate in grams/trip
ROAD DUST = resuspended road dust (PM10 grams/vmt)

TABLE E-82. VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES, OFF-BASE HOUSING AT NAF EL CENTRO

TRIP TYPE	PORTION OF TOTAL TRIPS	DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS										
		UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
WORK	30.00%	20.00%	25.00%	20.00%	10.00%	10.00%	2.00%	2.00%	4.00%	3.00%	2.00%	2.00%
SHOPPING	35.00%	40.00%	20.00%	15.00%	10.00%	5.00%	2.00%	1.00%	2.00%	2.00%	2.00%	1.00%
OTHER	35.00%	20.00%	15.00%	25.00%	10.00%	10.00%	3.00%	5.00%	5.00%	3.00%	2.00%	2.00%
SUM/MEAN	100.00%	27.00%	19.75%	20.00%	10.00%	8.25%	2.35%	2.70%	3.65%	2.65%	2.00%	1.65%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
WORK	16.08	63.56%	5.42%	31.01%	55.22%	13.77%	63.90%	5.08%
SHOPPING	12.83	40.65%	37.31%	22.04%	26.20%	51.76%	41.23%	36.73%
OTHER	17.43	43.29%	20.96%	35.75%	27.87%	36.38%	43.91%	20.33%
MEANS	15.41	48.45%	22.02%	29.53%	35.49%	34.98%	48.97%	21.50%

TABLE E-83. EMFAC7F INPUT DATA, TRIPS FROM NAF EL CENTRO OFF-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 90 WINTER: 60

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	78	81	85	96	101	105
WINTER	45	45	48	59	68	70

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

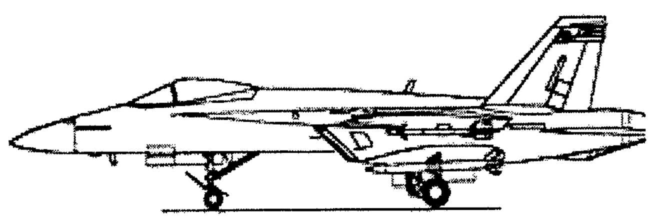
	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	63.56%	5.42%	31.02%	100.0%	0.0%	0.0%
H-S	40.65%	37.31%	22.04%	0.0%	100.0%	0.0%
H-O	43.29%	20.96%	35.75%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	63.56%	5.42%	31.02%			
SHOP	40.65%	37.31%	22.04%			
OTHER	43.29%	20.96%	35.75%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips (see 3 category mix)
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips (see 3 category mix)

TABLE E-84. 1999 EMISSION RATES, NAF EL CENTRO OFF-BASE HOUSING

POLLUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.81	1.15	0.96	0.87	0.90
	SHOP	1.68	1.02	0.84	0.74	0.78
	OTHER	1.67	1.01	0.83	0.73	0.77
NOx	WORK	1.11	0.93	0.93	1.05	1.34
	SHOP	1.07	0.90	0.89	1.02	1.30
	OTHER	1.03	0.86	0.85	0.97	1.26
CO-S	WORK	13.04	10.72	9.67	9.18	9.75
	SHOP	11.84	9.51	8.47	7.98	8.55
	OTHER	11.57	9.24	8.20	7.71	8.28
CO-W	WORK	18.43	16.23	15.23	14.77	15.28
	SHOP	14.37	12.16	11.16	10.70	11.21
	OTHER	14.72	12.51	11.52	11.05	11.56
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		SOAK	DRNL/RSTL		ROAD DUST	
	WORK	0.50	8.11		2.90	
	SHOP	0.50	8.11		2.90	
	OTHER	0.50	8.11		2.90	

NOTES: WORK = home-work trips
SHOP = home-shopping trips
OTHER = home-other trips
ROG = reactive organic gases (summer fuel volatility)
NOx = oxides of nitrogen (summer fuel volatility)
CO-S = carbon monoxide (summer fuel volatility)
CO-W = carbon monoxide (winter fuel volatility)
PMEX = exhaust particulate matter
PMTW = tire wear particulate matter
DRNL = diurnal evaporative emissions (grams/veh-day)
RSTL = resting loss evaporative emissions (g/veh-day)
SOAK = hot soak emission rate in grams/trip
ROAD DUST = resuspended road dust (PM10 grams/vmt)



EMISSIONS ESTIMATES FOR PERSONAL VEHICLE USE

TABLE E-85. TRIP GENERATION ESTIMATES FOR THE NAS LEMOORE ALTERNATIVE, PHASE 1

Land Use or Trip Generation Category	Trip Estimate Basis		Base Trip Generation Rate	Vehicle Generation Rate	P/A Trip Rate Splits: Productions	P/A Trip Rate Splits: Attractions	Base Trip Volume	% Productions W Internal Destinations	Number of Internal Trip Productions	% Attractions W Internal Origins	Number of Internal Trip Attractions	Internal/External Trips	Net Trips Generated	Adjusted Trip Rate	Trip Rate Adjustment Factor
On-Base BOQ/BEQ Housing	757	Personnel	6.47	1.0	95%	5%	4,898	0%	0	0%	0	4,898	4,898	6.47	0.0%
On-Base Family Housing, Commute	399	Personnel	2.00	1.2	95%	5%	798	0%	0	0%	0	798	798	2.00	0.0%
Family Housing, Dependents	399	Units	7.55	1.2	95%	5%	3,012	0%	0	0%	0	3,012	3,012	7.55	0.0%
Off-Base Housing, Commute	820	Personnel	2.00	1.2	95%	5%	1,640	0%	0	0%	0	1,640	1,640	2.00	0.0%
Off-Base, Dependents	820	Units	7.55	1.2	95%	5%	6,191	0%	0	0%	0	6,191	6,191	7.55	0.0%
Totals							16,539		0		0	16,539	16,539		0.0%

Notes: On-base and off-base distribution of added personnel based on data in Tables 2-2 and 4-6 of the EIS text.

Institute of Transportation Engineers (1991) trip generation rate for apartments (6.47 trips/day) used for on-base housing; ITE trip rate for single family dwellings (9.55 trips/day) used for off-base housing.

Trip rates for off-base housing are split into base-related work trips and other household trips to facilitate subsequent adjustments for squadron deployments and transportation control measure effects.

The vehicle generation rate is used in the emissions analysis to compute diurnal and resting loss emissions from parked vehicles.

Internal trips are trips within on-base or off-base housing areas.

Corrections to remove double-counted internal trips are based on balancing internal trip productions with internal trip attractions.

Production/attraction splits reflect the origin of a round trip.

Production/attraction split values and internal origin/destination percentages must be selected to balance internal productions with internal attractions.

Net trips generated = internal/external trips + 50% of internal productions + 50% of internal attractions.

No internal trip adjustments performed for this analysis.

TABLE E-86. TRIP PURPOSE DISAGGREGATION, DEPLOYMENT ADJUSTMENTS, AND TRAVEL SPEED DISTRIBUTIONS FOR THE NAS LEMOORE ALTERNATIVE, PHASE 1

Land Use or Trip Generation Category	Trip Estimate Basis		Trip Purpose	Percent of Net Trips	Net Trip Rates	Deployment Reduction	Adjusted Net Trip Rate	Adjusted Net Trips	Overall Reduction Factor	Mean Trip Duration (Minutes)	Percent of Travel Time by Speed (mph)				
											15	25	35	45	55
On-Base BOQ/BEQ Housing	757	Personnel	WORK	30.9%	2.00	14.8%	1.7	1,290		7.68	15.0%	25.0%	35.0%	20.0%	5.0%
			SHOPPING	35.0%	2.26	14.8%	1.9	1,461		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	34.1%	2.21	14.8%	1.9	1,423		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
On-Base Family Housing, Commute	399	Personnel	WORK	100.0%	2.00	14.8%	1.7	680		7.68	15.0%	25.0%	35.0%	20.0%	5.0%
			SHOPPING	0.0%	0.00	0.0%	0.0	0		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	0.0%	0.00	0.0%	0.0	0		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Family Housing, Dependents	399	Units	WORK	11.5%	0.87	0.0%	0.9	346		7.68	15.0%	25.0%	35.0%	20.0%	5.0%
			SHOPPING	44.3%	3.34	0.0%	3.3	1,333		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	44.3%	3.34	0.0%	3.3	1,333		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base Housing, Commute	820	Personnel	WORK	100.0%	2.00	13.9%	1.7	1,412		16.10	5.0%	25.0%	30.0%	20.0%	20.0%
			SHOPPING	0.0%	0.00	0.0%	0.0	0		11.83	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	0.0%	0.00	0.0%	0.0	0		15.45	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base, Dependents	820	Units	WORK	11.5%	0.87	0.0%	0.9	712		16.10	5.0%	25.0%	30.0%	20.0%	20.0%
			SHOPPING	44.3%	3.34	0.0%	3.3	2,740		11.83	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	44.3%	3.34	0.0%	3.3	2,740		15.45	10.0%	25.0%	35.0%	15.0%	15.0%
								....	....						
Totals								15,470	6.5%						

Notes: On average, 1 fleet squadron (275 personnel) will be deployed at any time at the completion of Phase 1.

Only military personnel (not civilian employees) are affected by squadron deployments.

For analysis purposes, deployed personnel have been distributed proportionately among on-base and off-base housing categories: 112 from BEQ/BOQ housing, 59 from family housing, and 114 from off-base housing.

Deployments will affect all trip categories from BEQ/BOQ housing.

Deployments will affect commute trips by military personnel from family housing and off-base housing, but other household trips (including other household work trips) will not be affected.

Mean trip durations were derived from estimated travel time frequency distributions by trip type, recognizing land use patterns, roadway network configurations, and distances between communities in the region surrounding NAS Lemoore.

Vehicle speed distributions were estimated from general road network features.

TABLE E-87. VEHICLE EMISSIONS FROM PERSONAL VEHICLE TRAVEL: NAS LEMOORE ALTERNATIVE, PHASE 1

LAND USE OR TRIP GENERATION CATEGORY	TRIP ESTIMATE BASIS		TRIP PURPOSE	AVERAGE DAILY TRIPS	MEAN TRIP DURATION (MINUTES)	AVERAGE DISTANCE (MILES)	DAILY VMT BY TRIP PURPOSE	AVERAGE TRAVEL SPEED (MPH)	ROG Emissions (lbs/day)	NOx Emissions (lbs/day)	PM10 Emissions (lbs/day)	Summer CO Emissions (lbs/day)	Winter CO Emissions (lbs/day)	SOx Emissions (lbs/day)
On-Base BOQ/BEQ Housing	757	Personnel	WORK	1,290	7.7	4.16	5,366	32.5	18.8	13.6	36.8	141.4	348.2	0.4
			SHOPPING	1,461	10.8	5.84	8,531	32.5	22.1	19.2	58.5	168.4	331.3	0.6
			OTHER	1,423	15.7	9.13	12,991	35.0	29.1	28.3	89.2	239.1	500.3	0.9
On-Base Family Housing, Commute	399	Personnel	WORK	680	7.7	4.16	2,829	32.5	14.7	7.2	19.4	74.6	183.5	0.2
			SHOPPING	0	10.8	5.84	0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
			OTHER	0	15.7	9.13	0	35.0	0.0	0.0	0.0	0.0	0.0	0.0
Family Housing, Dependents	399	Units	WORK	346	7.7	4.16	1,439	32.5	4.9	3.7	9.9	37.9	93.4	0.1
			SHOPPING	1,333	10.8	5.84	7,784	32.5	19.8	17.5	53.4	153.7	302.3	0.5
			OTHER	1,333	15.7	9.13	12,169	35.0	26.9	26.5	83.5	224.0	468.7	0.8
Off-Base Housing, Commute	820	Personnel	WORK	1,412	16.1	10.06	14,208	37.5	42.0	33.2	97.5	293.6	690.5	0.9
			SHOPPING	0	11.8	6.41	0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
			OTHER	0	15.5	9.01	0	35.0	0.0	0.0	0.0	0.0	0.0	0.0
Off-Base, Dependents	820	Units	WORK	712	16.1	10.06	7,165	37.5	16.8	16.7	49.2	148.1	348.2	0.5
			SHOPPING	2,740	11.8	6.41	17,558	32.5	43.0	38.7	120.5	337.2	658.6	1.2
			OTHER	2,740	15.5	9.01	24,694	35.0	55.1	54.1	169.5	460.1	966.0	1.6
Totals:			WORK	4,440	11.7	6.98	31,007	35.8	97.2	74.4	212.8	695.6	1,663.8	2.1
			SHOPPING	5,534	11.3	6.12	33,872	32.5	84.9	75.3	232.5	659.3	1,292.1	2.2
			OTHER	5,496	15.6	9.07	49,854	35.0	111.1	108.9	342.1	923.2	1,935.0	3.3
				15,470	12.9	7.42	114,734	34.4	293.2	258.5	787.4	2,278.1	4,891.0	7.6

TABLE E-87. VEHICLE EMISSIONS FROM PERSONAL VEHICLE TRAVEL: NAS LEMOORE ALTERNATIVE, PHASE 1

TRIP CATEGORY	AVERAGE DAILY TRIPS	DAILY VMT BY TRIP PURPOSE	TRAVEL DAYS/YEAR	ROG EMISSIONS (tons/year)	NOx EMISSIONS (tons/year)	CO EMISSIONS (tons/year)	SOx EMISSIONS (tons/year)	PM10 EMISSIONS (tons/yr)
Base-Related Work Trips	3,382	22,403	240 for all work trips	9.06	6.48	103.91	0.18	18.45
Other Household Trips (including work trips by dependents)	12,088	92,330	365 for all other trips	38.37	36.05	476.53	1.08	111.95
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Totals	15,470	114,734		47.43	42.53	580.45	1.26	130.40

Notes: VMT = vehicle miles traveled

ROG = reactive organic compounds

NOx = nitrogen oxides

CO = carbon monoxide

SOx = sulfur oxides

PM10 = inhalable particulate matter (includes resuspended road dust)

See Tables E-85 and E-86 for trip generation rates, mean trip durations, and travel speed distributions.

Vehicle trips are one-way travel events.

Emission rates for California vehicles were calculated for 1999 using the California Air Resources Board EMFAC7F computer program for exhaust emission rates, with diurnal and resting loss emissions calculated using data from the EMFAC7F model and calculation procedures presented in documentation reports for the EMFAC7EP and BURDEN7C models (California Air Resources Board 1991, 1992, 1993).

Exhaust emission rates are based on a summer air temperature of 85 degrees Fahrenheit and a winter air temperature of 40 degrees Fahrenheit.

Diurnal evaporative emissions are based on a summer day temperature profile (60-100 degree Fahrenheit range).

Exhaust emission rates incorporate cold start and hot start rate increments based on aggregate start mode travel fractions calculated from assumed trip-type travel time frequency distributions.

PM10 emission rates include exhaust emissions, tire wear, and 2.9 grams/VMT for resuspended paved roadway dust.

Sulfur oxide emissions estimated as 0.03 grams per vmt (Bay Area Air Quality Management District 1996).

Other household travel includes work trips that are not base-related (i.e., a spouse's work trips) plus all shopping and other trips.

Base-related and other household work trips occur 240 days per year.

Other household trips (shopping and other trip categories) occur 365 days per year.

TABLE E-88. TRIP GENERATION ESTIMATES FOR THE NAF EL CENTRO ALTERNATIVE, PHASE 1

Land Use or Trip Generation Category	Trip Estimate Basis		Base Trip Generation Rate	Vehicle Generation Rate	P/A Trip Rate Splits		Base Trip Volume	% Productions W Internal Destinations	Number of Internal Trip Productions	% Attractions W Internal Origins	Number of Internal Trip Attractions	Internal/External Trips	Net Trips Generated	Adjusted Trip Rate	Trip Rate Adjustment Factor
					Productions	Attractions									
On-Base BOQ/BEQ Housing	780	Personnel	6.47	1.0	95%	5%	5,047	0%	0	0%	0	5,047	5,047	6.47	0.0%
On-Base Family Housing, Commute	400	Personnel	2.00	1.2	95%	5%	800	0%	0	0%	0	800	800	2.00	0.0%
Family Housing, Dependents	400	Units	7.55	1.2	95%	5%	3,020	0%	0	0%	0	3,020	3,020	7.55	0.0%
Off-Base Housing, Commute	796	Personnel	2.00	1.2	95%	5%	1,592	0%	0	0%	0	1,592	1,592	2.00	0.0%
Off-Base, Dependents	796	Units	7.55	1.2	95%	5%	6,010	0%	0	0%	0	6,010	6,010	7.55	0.0%
Totals							16,469		0		0	16,469	16,469		0.0%

Notes: On-base and off-base distribution of added personnel based on Phase 1 personnel numbers (Table 2-2 of the EIS text) and NAF El Centro Phase 1 on-base housing construction estimates in Table E-10.

Institute of Transportation Engineers (1991) trip generation rate for apartments (6.47 trips/day) used for on-base housing; ITE trip rate for single family dwellings (9.55 trips/day) used for off-base housing.

Trip rates for off-base housing are split into base-related work trips and other household trips to facilitate subsequent adjustments for squadron deployments and transportation control measure effects.

The vehicle generation rate is used in the emissions analysis to compute diurnal and resting loss emissions from parked vehicles.

Internal trips are trips within on-base or off-base housing areas.

Corrections to remove double-counted internal trips are based on balancing internal trip productions with internal trip attractions.

Production/attraction splits reflect the origin of a round trip.

Production/attraction split values and internal origin/destination percentages must be selected to balance internal productions with internal attractions.

Net trips generated = internal/external trips + 50% of internal productions + 50% of internal attractions.

No internal trip adjustments performed for this analysis.

TABLE E-89. TRIP PURPOSE DISAGGREGATION, DEPLOYMENT ADJUSTMENTS, AND TRAVEL SPEED DISTRIBUTIONS FOR THE NAF EL CENTRO ALTERNATIVE, PHASE 1

Land Use or Trip Generation Category	Trip Estimate Basis		Trip Purpose	Percent of Net Trips	Net Trip Rates	Deployment Reduction	Adjusted Net Trip Rate	Adjusted Net Trips	Overall Reduction Factor	Mean Trip Duration (Minutes)	Percent of Travel Time by Speed (mph) 15	25	35	45	55
On-Base BOQ/BEQ Housing	780	Personnel	WORK	30.9%	2.00	14.9%	1.7	1,328		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
			SHOPPING	35.0%	2.26	14.9%	1.9	1,504		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	34.1%	2.21	14.9%	1.9	1,465		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
On-Base Family Housing, Commute	400	Personnel	WORK	100.0%	2.00	14.8%	1.7	682		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
			SHOPPING	0.0%	0.00	0.0%	0.0	0		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	0.0%	0.00	0.0%	0.0	0		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Family Housing, Dependents	400	Units	WORK	11.5%	0.87	0.0%	0.9	347		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
			SHOPPING	44.3%	3.34	0.0%	3.3	1,336		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	44.3%	3.34	0.0%	3.3	1,336		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base Housing, Commute	796	Personnel	WORK	100.0%	2.00	12.6%	1.7	1,392		16.08	5.0%	25.0%	30.0%	20.0%	20.0%
			SHOPPING	0.0%	0.00	0.0%	0.0	0		12.83	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	0.0%	0.00	0.0%	0.0	0		17.43	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base, Dependents	796	Units	WORK	11.5%	0.87	0.0%	0.9	691		16.08	5.0%	25.0%	30.0%	20.0%	20.0%
			SHOPPING	44.3%	3.34	0.0%	3.3	2,659		12.83	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	44.3%	3.34	0.0%	3.3	2,659		17.43	10.0%	25.0%	35.0%	15.0%	15.0%
Totals								15,399	6.5%						

Notes: On average, 1 fleet squadron (275 personnel) will be deployed at any time at the completion of Phase 1.
Only military personnel (not civilian employees) are affected by squadron deployments.
For analysis purposes, deployed personnel have been distributed proportionately among on-base and off-base housing categories: 116 from BEQ/BOQ housing, 59 from family housing, and 100 from off-base housing.
Deployments will affect all trip categories from BEQ/BOQ housing.
Deployments will affect commute trips by military personnel from family housing and off-base housing, but other household trips (including other household work trips) will not be affected.
Mean trip durations were derived from estimated travel time frequency distributions by trip type, recognizing land use patterns, roadway network configurations, and distances between communities in the region surrounding NAF El Centro.
Vehicle speed distributions were estimated from general road network features.

TABLE E-90. VEHICLE EMISSIONS FROM PERSONAL VEHICLE TRAVEL: NAF EL CENTRO ALTERNATIVE, PHASE 1

LAND USE OR TRIP GENERATION CATEGORY	TRIP ESTIMATE BASIS		TRIP PURPOSE	AVERAGE DAILY TRIPS	MEAN TRIP DURATION (MINUTES)	AVERAGE DISTANCE (MILES)	DAILY VMT BY TRIP PURPOSE	AVERAGE TRAVEL SPEED (MPH)	ROG Emissions (lbs/day)	NOx Emissions (lbs/day)	PM10 Emissions (lbs/day)	Summer CO Emissions (lbs/day)	Winter CO Emissions (lbs/day)	SOx Emissions (lbs/day)
On-Base BOQ/BEQ Housing	780	Personnel	WORK	1,328	7.7	2.18	2,890	17.0	17.2	7.6	19.8	92.2	138.9	0.2
			SHOPPING	1,504	10.8	5.84	8,782	32.5	24.1	19.8	60.3	179.4	235.6	0.6
			OTHER	1,465	15.7	9.13	13,374	35.0	31.4	29.2	91.8	253.1	353.3	0.9
On-Base Family Housing, Commute	400	Personnel	WORK	682	7.7	2.18	1,484	17.0	15.2	3.9	10.2	47.4	71.4	0.1
			SHOPPING	0	10.8	5.84	0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
			OTHER	0	15.7	9.13	0	35.0	0.0	0.0	0.0	0.0	0.0	0.0
Family Housing, Dependents	400	Units	WORK	347	7.7	2.18	755	17.0	4.4	2.0	5.2	24.1	36.3	0.0
			SHOPPING	1,336	10.8	5.84	7,801	32.5	20.9	17.6	53.5	159.4	209.3	0.5
			OTHER	1,336	15.7	9.13	12,197	35.0	28.2	26.6	83.7	230.8	322.2	0.8
Off-Base Housing, Commute	796	Personnel	WORK	1,392	16.1	10.05	13,990	37.5	45.1	33.3	96.0	302.8	473.8	0.9
			SHOPPING	0	12.8	6.95	0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
			OTHER	0	17.4	10.17	0	35.0	0.0	0.0	0.0	0.0	0.0	0.0
Off-Base, Dependents	796	Units	WORK	691	16.1	10.05	6,945	37.5	17.2	16.6	47.7	150.3	235.2	0.5
			SHOPPING	2,659	12.8	6.95	18,479	32.5	46.4	40.3	126.8	360.6	469.4	1.2
			OTHER	2,659	17.4	10.17	27,035	35.0	60.7	58.5	185.5	503.8	700.6	1.8
Totals:			WORK	4,440	11.6	5.87	26,063	30.3	99.1	63.4	178.9	616.9	955.6	1.7
			SHOPPING	5,499	11.8	6.38	35,062	32.5	91.5	77.7	240.6	699.4	914.2	2.3
			OTHER	5,460	16.5	9.63	52,606	35.0	120.3	114.3	361.0	987.7	1,376.0	3.5
				15,399	13.4	7.39	113,731	33.0	310.9	255.5	780.5	2,303.9	3,245.8	7.5

TABLE E-90. VEHICLE EMISSIONS FROM PERSONAL VEHICLE TRAVEL: NAF EL CENTRO ALTERNATIVE, PHASE 1

TRIP CATEGORY	AVERAGE DAILY TRIPS	DAILY VMT BY TRIP PURPOSE	TRAVEL DAYS/YEAR	ROG EMISSIONS (tons/year)	NOx EMISSIONS (tons/year)	CO EMISSIONS (tons/year)	SOx EMISSIONS (tons/year)	PM10 EMISSIONS (tons/yr)
Base-Related Work Trips	3,402	18,363	240 for all work trips	9.31	5.39	67.59	0.15	15.12
Other Household Trips (including work trips by dependents)	11,997	95,368	365 for all other trips	41.24	37.27	389.68	1.12	116.14
Totals	15,399	113,731		50.55	42.66	457.28	1.27	131.27

Notes: VMT = vehicle miles traveled

ROG = reactive organic compounds

NOx = nitrogen oxides

CO = carbon monoxide

SOx = sulfur oxides

PM10 = inhalable particulate matter (includes resuspended road dust)

See Tables E-88 and E-89 for trip generation rates, mean trip durations, and travel speed distributions.

Vehicle trips are one-way travel events.

Emission rates for California vehicles were calculated for 1999 using the California Air Resources Board EMFAC7F computer program for exhaust emission rates, with diurnal and resting loss emissions calculated using data from the EMFAC7F model and calculation procedures presented in documentation reports for the EMFAC7EP and BURDEN7C models (California Air Resources Board 1991, 1992, 1993).

Exhaust emission rates are based on a summer air temperature of 90 degrees Fahrenheit and a winter air temperature of 60 degrees Fahrenheit.

Diurnal evaporative emissions are based on a summer day temperature profile (78-105 degree Fahrenheit range).

Exhaust emission rates incorporate cold start and hot start rate increments based on aggregate start mode travel fractions calculated from assumed trip-type travel time frequency distributions.

PM10 emission rates include exhaust emissions, tire wear, and 2.9 grams/VMT for resuspended paved roadway dust.

Sulfur oxide emissions estimated as 0.03 grams per vmt (Bay Area Air Quality Management District 1996).

Other household travel includes work trips that are not base-related (i.e., a spouse's work trips) plus all shopping and other trips.

Base-related and other household work trips occur 240 days per year.

Other household trips (shopping and other trip categories) occur 365 days per year.

TABLE E-91. TRIP GENERATION ESTIMATES FOR THE NAF EL CENTRO ALTERNATIVE, PHASE 2

Land Use or Trip Generation Category	Trip Estimate Basis		Base Trip Generation Rate	Vehicle Generation Rate	P/A Trip Rate Splits Productions	P/A Trip Rate Splits Attractions	Base Trip Volume	% Productions W Internal Destinations	Number of Internal Trip Productions	% Attractions W Internal Origins	Number of Internal Trip Attractions	Internal/ External Trips	Net Trips Generated	Adjusted Trip Rate	Trip Rate Adjustment Factor
On-Base BOQ/BEQ Housing	1,426	Personnel	6.47	1.0	95%	5%	9,226	0%	0	0%	0	9,226	9,226	6.47	0.0%
On-Base Family Housing, Commute	775	Personnel	2.00	1.2	95%	5%	1,550	0%	0	0%	0	1,550	1,550	2.00	0.0%
Family Housing, Dependents	775	Units	7.55	1.2	95%	5%	5,851	0%	0	0%	0	5,851	5,851	7.55	0.0%
Off-Base Housing, Commute	1,442	Personnel	2.00	1.2	95%	5%	2,884	0%	0	0%	0	2,884	2,884	2.00	0.0%
Off-Base, Dependents	1,442	Units	7.55	1.2	95%	5%	10,887	0%	0	0%	0	10,887	10,887	7.55	0.0%
Totals							30,398		0		0	30,398	30,398		0.0%

Notes: On-base and off-base distribution of added personnel based on Phase 2 personnel numbers (Table 2-6 of the EIS text) and NAF El Centro Phase 1 and Phase 2 on-base housing construction estimates in Table E-10.

Institute of Transportation Engineers (1991) trip generation rate for apartments (6.47 trips/day) used for on-base housing; ITE trip rate for single family dwellings (9.55 trips/day) used for off-base housing.

Trip rates for off-base housing are split into base-related work trips and other household trips to facilitate subsequent adjustments for squadron deployments and transportation control measure effects.

The vehicle generation rate is used in the emissions analysis to compute diurnal and resting loss emissions from parked vehicles.

Internal trips are trips within on-base or off-base housing areas.

Corrections to remove double-counted internal trips are based on balancing internal trip productions with internal trip attractions.

Production/attraction splits reflect the origin of a round trip.

Production/attraction split values and internal origin/destination percentages must be selected to balance internal productions with internal attractions.

Net trips generated = internal/external trips + 50% of internal productions + 50% of internal attractions.

No internal trip adjustments performed for this analysis.

TABLE E-92. TRIP PURPOSE DISAGGREGATION, DEPLOYMENT ADJUSTMENTS, AND TRAVEL SPEED DISTRIBUTIONS FOR THE NAF EL CENTRO ALTRENATIVE, PHASE 2

Land Use or Trip Generation Category	Trip Estimate Basis		Trip Purpose	Percent of Net Trips	Net Trip Rates	Deployment Reduction	Adjusted Net Trip Rate	Adjusted Net Trips	Overall Reduction Factor	Mean Trip Duration (Minutes)	Percent of Travel Time by Speed (mph)				
											15	25	35	45	55
On-Base BOQ/BEQ Housing	1,426	Personnel	WORK	30.9%	2.00	14.4%	1.7	2,441		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
			SHOPPING	35.0%	2.26	8.1%	2.1	2,966		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	34.1%	2.21	8.1%	2.0	2,890		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
On-Base Family Housing, Commute	775	Personnel	WORK	100.0%	2.00	14.5%	1.7	1,326		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
			SHOPPING	0.0%	0.00	0.0%	0.0	0		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	0.0%	0.00	0.0%	0.0	0		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Family Housing, Dependents	775	Units	WORK	11.5%	0.87	0.0%	0.9	673		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
			SHOPPING	44.3%	3.34	0.0%	3.3	2,589		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	44.3%	3.34	0.0%	3.3	2,589		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base Housing, Commute	1,442	Personnel	WORK	100.0%	2.00	12.4%	1.8	2,526		16.08	5.0%	25.0%	30.0%	20.0%	20.0%
			SHOPPING	0.0%	0.00	0.0%	0.0	0		12.83	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	0.0%	0.00	0.0%	0.0	0		17.43	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base, Dependents	1,442	Units	WORK	11.5%	0.87	0.0%	0.9	1,252		16.08	5.0%	25.0%	30.0%	20.0%	20.0%
			SHOPPING	44.3%	3.34	0.0%	3.3	4,817		12.83	10.0%	35.0%	35.0%	10.0%	10.0%
			OTHER	44.3%	3.34	0.0%	3.3	4,817		17.43	10.0%	25.0%	35.0%	15.0%	15.0%
Totals								28,886	5.0%						

Notes: On average, 2 fleet squadron (496 personnel) will be deployed at any time at the completion of Phase 2.

Only military personnel (not civilian employees) are affected by squadron deployments.

For analysis purposes, deployed personnel have been distributed proportionately among on-base and off-base housing categories: 205 from BEQ/BOQ housing, 112 from family housing, and 179 from off-base housing.

Deployments will affect all trip categories from BEQ/BOQ housing.

Deployments will affect commute trips by military personnel from family housing and off-base housing, but other household trips (including other household work trips) will not be affected.

Mean trip durations were derived from estimated travel time frequency distributions by trip type, recognizing land use patterns, roadway network configurations, and distances between communities in the region surrounding NAF El Centro.

Vehicle speed distributions were estimated from general road network features.

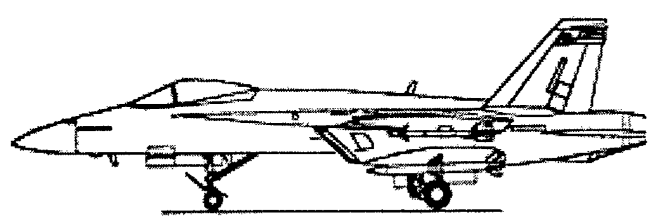
TABLE E-93. VEHICLE EMISSIONS FROM PERSONAL VEHICLE TRAVEL: NAF EL CENTRO ALTERNATIVE, PHASE 2

LAND USE OR TRIP GENERATION CATEGORY	TRIP ESTIMATE BASIS	TRIP PURPOSE	AVERAGE DAILY TRIPS	MEAN TRIP DURATION (MINUTES)	AVERAGE DISTANCE (MILES)	DAILY VMT BY TRIP PURPOSE	AVERAGE TRAVEL SPEED (MPH)	ROG Emissions (lbs/day)	NOx Emissions (lbs/day)	PM10 Emissions (lbs/day)	Summer CO Emissions (lbs/day)	Winter CO Emissions (lbs/day)	SOx Emissions (lbs/day)
On-Base BOQ/BEQ Housing	1,426 Personnel	WORK	2,441	7.7	2.18	5,312	17.0	31.6	14.0	36.5	169.5	255.4	0.4
		SHOPPING	2,966	10.8	5.84	17,319	32.5	46.9	39.0	118.9	353.8	464.6	1.1
		OTHER	2,890	15.7	9.13	26,383	35.0	61.4	57.6	181.1	499.3	696.9	1.7
On-Base Family Housing, Commute	775 Personnel	WORK	1,326	7.7	2.18	2,885	17.0	29.5	7.6	19.8	92.1	138.7	0.2
		SHOPPING	0	10.8	5.84	0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
		OTHER	0	15.7	9.13	0	35.0	0.0	0.0	0.0	0.0	0.0	0.0
Family Housing, Dependents	775 Units	WORK	673	7.7	2.18	1,464	17.0	8.5	3.9	10.1	46.7	70.4	0.1
		SHOPPING	2,589	10.8	5.84	15,118	32.5	40.6	34.1	103.8	308.8	405.5	1.0
		OTHER	2,589	15.7	9.13	23,635	35.0	54.6	51.6	162.2	447.3	624.3	1.6
Off-Base Housing, Commute	1,442 Personnel	WORK	2,526	16.1	10.05	25,386	37.5	81.9	60.5	174.2	549.6	859.8	1.7
		SHOPPING	0	12.8	6.95	0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
		OTHER	0	17.4	10.17	0	35.0	0.0	0.0	0.0	0.0	0.0	0.0
Off-Base, Dependents	1,442 Units	WORK	1,252	16.1	10.05	12,583	37.5	31.2	30.0	86.4	272.4	426.1	0.8
		SHOPPING	4,817	12.8	6.95	33,476	32.5	84.1	73.1	229.7	653.3	850.4	2.2
		OTHER	4,817	17.4	10.17	48,977	35.0	110.0	105.9	336.1	912.6	1,269.1	3.2
Totals:		WORK	8,218	11.5	5.80	47,630	30.1	182.6	116.0	326.9	1,130.3	1,750.4	3.2
		SHOPPING	10,372	11.7	6.35	65,913	32.5	171.6	146.2	452.4	1,315.9	1,720.4	4.4
		OTHER	10,296	16.5	9.61	98,996	35.0	226.0	215.1	679.4	1,859.3	2,590.3	6.5
			28,886	13.4	7.36	212,539	33.0	580.2	477.3	1,458.6	4,305.4	6,061.2	14.1

TABLE E-93. VEHICLE EMISSIONS FROM PERSONAL VEHICLE TRAVEL: NAF EL CENTRO ALTERNATIVE, PHASE 2

TRIP CATEGORY	AVERAGE DAILY TRIPS	DAILY VMT BY TRIP PURPOSE	TRAVEL DAYS/YEAR	ROG EMISSIONS (tons/year)	NOx EMISSIONS (tons/year)	CO EMISSIONS (tons/year)	SOx EMISSIONS (tons/year)	PM10 EMISSIONS (tons/yr)
Base-Related Work Trips	6,293	33,583	240 for all work trips	17.16	9.86	123.90	0.27	27.66
Other Household Trips (including work trips by dependents)	22,593	178,955	365 for all other trips	77.32	70.00	732.03	2.10	218.11
	....	....		....	....	....	....	....
Totals	28,886	212,539		94.48	79.86	855.93	2.37	245.77

Notes: VMT = vehicle miles traveled
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter (includes resuspended road dust)
See Tables E-91 and E-92 for trip generation rates, mean trip durations, and travel speed distributions.
Vehicle trips are one-way travel events.
Emission rates for California vehicles were calculated for 1999 using the California Air Resources Board EMFAC7F computer program for exhaust emission rates, with diurnal and resting loss emissions calculated using data from the EMFAC7F model and calculation procedures presented in documentation reports for the EMFAC7EP and BURDEN7C models (California Air Resources Board 1991, 1992, 1993).
Exhaust emission rates are based on a summer air temperature of 90 degrees Fahrenheit and a winter air temperature of 60 degrees Fahrenheit.
Diurnal evaporative emissions are based on a summer day temperature profile (78-105 degree Fahrenheit range).
Exhaust emission rates incorporate cold start and hot start rate increments based on aggregate start mode travel fractions calculated from assumed trip-type travel time frequency distributions.
PM10 emission rates include exhaust emissions, tire wear, and 2.9 grams/VMT for resuspended paved roadway dust.
Sulfur oxide emissions estimated as 0.03 grams per vmt (Bay Area Air Quality Management District 1996).
Other household travel includes work trips that are not base-related (i.e., a spouse's work trips) plus all shopping and other trips.
Base-related and other household work trips occur 240 days per year.
Other household trips (shopping and other trip categories) occur 365 days per year.



VEHICLE USE AND EMISSION ESTIMATES, GOVERNMENT VEHICLES

TABLE E-94. VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES, FRS AND FLEET SQUADRON VEHICLES

TRIP TYPE	PORTION OF TOTAL TRIPS	DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS: UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
OFF-BASE	20.00%	0.00%	10.00%	10.00%	20.00%	25.00%	15.00%	6.00%	5.00%	3.00%	2.00%	4.00%
ON-BASE	80.00%	50.00%	20.00%	10.00%	10.00%	5.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SUM/MEAN	100.00%	40.00%	18.00%	10.00%	12.00%	9.00%	7.00%	1.20%	1.00%	0.60%	0.40%	0.80%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
OFF-BASE	24.05	20.08%	23.95%	55.97%	10.78%	33.24%	20.15%	23.88%
ON-BASE	10.05	32.61%	51.29%	16.10%	15.10%	68.80%	32.74%	51.16%
MEANS	12.85	30.10%	45.82%	24.07%	14.23%	61.69%	30.22%	45.70%

TABLE E-95. EMFAC7F INPUT DATA, TRIPS BY NAS LEMOORE GOVERNMENT VEHICLES

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
0.00%	97.00%	3.00%	0.00%	0.00%	0.00%	0.00%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 85 WINTER: 40

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	60	64	70	86	94	100
WINTER	35	35	37	43	49	50

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE
OFF-BASE	20.08%	23.95%	55.97%
ON-BASE	32.61%	51.29%	16.10%

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
OFF-BASE = trips coming onto or leaving the base
ON-BASE = trips remaining within base boundaries

TABLE E-96. 1999 EMISSION RATES, NAS LEMOORE GOVERNMENT VEHICLES

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	OFF-BASE	1.13	0.69	0.56	0.47	0.49
	ON-BASE	1.29	0.85	0.72	0.63	0.66
NOx	OFF-BASE	0.97	0.76	0.75	0.89	1.20
	ON-BASE	1.16	0.95	0.94	1.09	1.40
CO-S	OFF-BASE	9.26	7.28	6.38	5.91	6.56
	ON-BASE	11.74	9.76	8.85	8.38	9.04
CO-W	OFF-BASE	10.99	8.24	6.98	6.34	7.25
	ON-BASE	13.03	10.28	9.02	8.37	9.29
PMEX	OFF-BASE	0.01	0.01	0.01	0.01	0.01
	ON-BASE	0.01	0.01	0.01	0.01	0.01
PMTW	OFF-BASE	0.20	0.20	0.20	0.20	0.20
	ON-BASE	0.20	0.20	0.20	0.20	0.20

	SOAK	DRNL/RSTL	ROAD DUST
OFF-BASE	0.47	11.68	2.90
ON-BASE	0.47	11.68	2.90

NOTES: OFF-BASE = trips coming onto or leaving the base
ON-BASE = trips remaining within base boundaries
ROG = reactive organic gases (summer fuel volatility)
NOx = oxides of nitrogen (summer fuel volatility)
CO-S = carbon monoxide (summer fuel volatility)
CO-W = carbon monoxide (winter fuel volatility)
PMEX = exhaust particulate matter
PMTW = tire wear particulate matter
DRNL = diurnal evaporative emissions (grams/veh-day)
RSTL = resting loss evaporative emissions (g/veh-day)
SOAK = hot soak emission rate in grams/trip
ROAD DUST = resuspended road dust (PM10 grams/vmt)

TABLE E-97. EMFAC7F INPUT DATA, TRIPS BY NAF EL CENTRO GOVERNMENT VEHICLES

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
0.00%	97.00%	3.00%	0.00%	0.00%	0.00%	0.00%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 90 WINTER: 60

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	78	81	85	96	101	105
WINTER	45	45	48	59	68	70

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE
OFF-BASE	20.08%	23.95%	55.97%
ON-BASE	32.61%	51.29%	16.10%

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
OFF-BASE = trips coming onto or leaving the base
ON-BASE = trips remaining within base boundaries

TABLE E-98. 1999 EMISSION RATES, NAF EL CENTRO GOVERNMENT VEHICLES

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	OFF-BASE	1.23	0.72	0.58	0.49	0.52
	ON-BASE	1.40	0.89	0.75	0.66	0.68
NOx	OFF-BASE	0.96	0.76	0.75	0.89	1.20
	ON-BASE	1.15	0.94	0.93	1.08	1.39
CO-S	OFF-BASE	10.01	7.82	6.81	6.29	7.02
	ON-BASE	12.61	10.42	9.41	8.89	9.62
CO-W	OFF-BASE	9.10	7.06	6.12	5.65	6.32
	ON-BASE	11.29	9.25	8.31	7.84	8.51
PMEX	OFF-BASE	0.01	0.01	0.01	0.01	0.01
	ON-BASE	0.01	0.01	0.01	0.01	0.01
PMTW	OFF-BASE	0.20	0.20	0.20	0.20	0.20
	ON-BASE	0.20	0.20	0.20	0.20	0.20
		SOAK	DRNL/RSTL		ROAD DUST	
	OFF-BASE	0.47	16.06		2.90	
	ON-BASE	0.47	16.06		2.90	

NOTES: OFF-BASE = trips coming onto or leaving the base
ON-BASE = trips remaining within base boundaries
ROG = reactive organic gases (summer fuel volatility)
NOx = oxides of nitrogen (summer fuel volatility)
CO-S = carbon monoxide (summer fuel volatility)
CO-W = carbon monoxide (winter fuel volatility)
PMEX = exhaust particulate matter
PMTW = tire wear particulate matter
DRNL = diurnal evaporative emissions (grams/veh-day)
RSTL = resting loss evaporative emissions (g/veh-day)
SOAK = hot soak emission rate in grams/trip
ROAD DUST = resuspended road dust (PM10 grams/vmt)

TABLE E-99. COMPOSITE EMISSION FACTORS FOR GOVERNMENT VEHICLES

		EMISSION RATES, GRAMS PER VMT				
LOCATION	POLLUTANT	15 MPH	25 MPH	35 MPH	45 MPH	55 MPH
NAS LEMOORE ON-BASE	ROG	1.70	1.26	1.14	1.05	1.07
	NOx	1.16	0.95	0.94	1.09	1.40
	CO	12.38	10.02	8.93	8.38	9.16
	SOx	0.03	0.03	0.03	0.03	0.03
	PM10	3.11	3.11	3.11	3.11	3.11
NAS LEMOORE OFF-BASE	ROG	1.50	1.06	0.93	0.84	0.87
	NOx	0.97	0.76	0.75	0.89	1.20
	CO	10.13	7.76	6.68	6.12	6.91
	SOx	0.03	0.03	0.03	0.03	0.03
	PM10	3.11	3.11	3.11	3.11	3.11
NAF EL CENTRO ON-BASE	ROG	1.93	1.42	1.28	1.18	1.21
	NOx	1.15	0.94	0.93	1.08	1.39
	CO	11.95	9.83	8.86	8.36	9.07
	SOx	0.03	0.03	0.03	0.03	0.03
	PM10	3.11	3.11	3.11	3.11	3.11
NAF EL CENTRO OFF-BASE	ROG	1.82	1.31	1.17	1.07	1.10
	NOx	0.96	0.76	0.75	0.89	1.20
	CO	9.55	7.44	6.47	5.97	6.67
	SOx	0.03	0.03	0.03	0.03	0.03
	PM10	3.11	3.11	3.11	3.11	3.11

NOTES: ON-BASE = trips remaining within base boundaries
OFF-BASE = trips coming onto or leaving the base
ROG = reactive organic gases (exhaust + evaporatives, summer rates)
NOx = oxides of nitrogen (summer rates)
CO = carbon monoxide (average of summer and winter rates)
SOx = sulfur oxides
PM10 = inhalable particulate matter (exhaust, tire wear, road dust)
Emission rates based on data in Tables E-96 and E-98.
Evaporative emissions for on-base trips computed for 7.6 trips per day and 37 vmt per day per vehicle.
Evaporative emissions for off-base trips computed for 1.9 trips per day and 33.6 vmt per day per vehicle.
Sulfur oxide emission rate based on Bay Area Air Quality Management District (1996).

TABLE E-100. ESTIMATED DISTRIBUTION OF GOVERMENT VEHICLE VMT BY AVERAGE ROUTE SPEED

DISTRIBUTION OF TRAVEL TIME VS SPEED:

TRIP CATEGORY	FRACTION OF TRIPS	MEAN TRIP DURATION (MINUTES)	PERCENT TIME AT AVERAGE ROUTE SPEED 15 MPH	25 MPH	35 MPH	45 MPH	55 MPH	AVERAGE TRIP DISTANCE (MILES)
ON-BASE	80%	10.05	20.0%	35.0%	30.0%	15.0%	0.0%	4.86
OFF-BASE	20%	24.05	5.0%	10.0%	15.0%	30.0%	40.0%	17.64
COMBINED		12.85						7.41

Trip fractions and mean trip durations from Table E-94.
Travel time distributions estimated.

DISTRIBUTION OF VMT VS SPEED:

TRIP CATEGORY	MEAN TRIP TIME (MINUTES)	AVERAGE TRIP DISTANCE (MILES)	PERCENT VMT BY AVERAGE ROUTE SPEED 15 MPH	25 MPH	35 MPH	45 MPH	55 MPH	FRACTION OF TOTAL VMT
ON-BASE	10.05	4.86	10.3%	30.2%	36.2%	23.3%	0.0%	52.4%
OFF-BASE	24.05	17.64	1.7%	5.7%	11.9%	30.7%	50.0%	47.6%

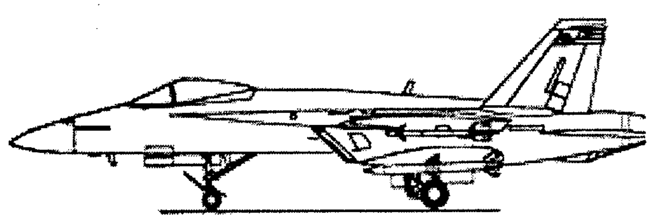
VMT distributions calculated from travel time distributions and speed assumptions.

TABLE E-101. ESTIMATED EMISSIONS FROM ADDED GOVERNMENT VEHICLE USE

LOCATION	GOV VEHICLE TRAVEL COMPONENT	ANNUAL VMT	EQUIVALENT TRIPS PER DAY	ESTIMATED EMISSIONS, TONS PER YEAR ROG	NOx	CO	SOx	PM10
NAS LEMOORE, NET ADDITION	ON-BASE	71,024	60.9	0.09	0.08	0.74	0.002	0.24
	OFF-BASE	64,468	15.2	0.06	0.07	0.48	0.002	0.22
	TOTAL	135,492	76.2	0.16	0.15	1.22	0.004	0.46
NAF EL CENTRO, PHASE 1	ON-BASE	71,024	60.9	0.11	0.08	0.73	0.002	0.24
	OFF-BASE	64,468	15.2	0.08	0.07	0.46	0.002	0.22
	TOTAL	135,492	76.2	0.19	0.15	1.20	0.004	0.46
NAF EL CENTRO, PHASE 2	ON-BASE	146,507	125.7	0.22	0.16	1.51	0.005	0.50
	OFF-BASE	132,985	31.4	0.16	0.15	0.96	0.004	0.46
	TOTAL	279,492	157.1	0.39	0.31	2.47	0.009	0.96

NOTES: ON-BASE = trips remaining within base boundaries
OFF-BASE = trips coming onto or leaving the base
VMT = vehicle miles traveled
ROG = reactive organic gases (exhaust + evaporatives, summer rates)
NOx = oxides of nitrogen (summer rates)
CO = carbon monoxide (average of summer and winter rates)
SOx = sulfur oxides
PM10 = inhalable particulate matter (exhaust, tire wear, road dust)

The F/A-18E/F action will add 4 vehicles for the FRS squadron and 1 vehicle per fleet squadron to the existing government vehicle fleet; most of the added vehicles will be light duty trucks.
Annual vmt for the added government vehicles estimated by NAS Lemoore staff from current squadron vehicle use data.
On-base versus off-base VMT partitioning based on Table E-100.
Composite 1999 emission factors for government vehicles are summarized in Table E-99.



EMISSIONS SUMMARY FOR CLEAN AIR ACT CONFORMITY DETERMINATION, NAS LEMOORE ALTERNTATIVE

TABLE E-102. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
1999	Construction Activity	1.42	20.74	9.71	2.08	14.35
	1999 CAA Conformity Total	1.42	20.74	9.71	2.08	14.35
2000	Construction Activity	0.89	12.83	6.37	1.29	8.20
	F/A-18 E/F Operations	138.24	129.39	591.23	4.20	65.90
	F/A-18 E/F Engine Run-Ups	5.27	5.09	26.90	0.18	2.71
	Aircraft Refueling	0.21	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	4.95	5.49	97.95	0.14	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	4.53	3.24	51.96	0.09	9.23
	Added Government Vehicle Use	0.08	0.08	0.61	0.00	0.23
	2000 CAA Conformity Total	154.16	156.12	775.03	5.90	86.61
2001	Construction Activity	0.84	12.39	5.55	1.26	7.64
	F/A-18 E/F Operations	253.95	236.48	1,086.09	7.68	120.64
	F/A-18 E/F Engine Run-Ups	9.92	9.58	50.64	0.34	5.09
	Aircraft Refueling	0.38	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	9.10	10.09	179.95	0.25	0.63
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	5.89	4.21	67.54	0.12	11.99
	Added Government Vehicle Use	0.10	0.10	0.79	0.00	0.30
	2001 CAA Conformity Total	280.18	272.84	1,390.57	9.64	146.30
2002	Construction Activity	0.78	11.57	5.23	1.17	7.37
	F/A-18 E/F Operations	279.58	254.36	1,195.45	8.30	130.75
	F/A-18 E/F Engine Run-Ups	12.09	11.67	61.72	0.41	6.21
	Aircraft Refueling	0.44	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.02	11.11	198.15	0.28	0.69
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	7.24	5.18	83.13	0.14	14.76
	Added Government Vehicle Use	0.13	0.12	0.98	0.00	0.37
	2002 CAA Conformity Total	310.28	294.01	1,544.66	10.31	160.15

TABLE E-102. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
2003, 2004	F/A-18 E/F Operations	305.21	272.24	1,304.81	8.92	140.86
	F/A-18 E/F Engine Run-Ups	14.25	13.77	72.80	0.48	7.32
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2003 CAA Conformity Total	340.12	304.77	1,699.09	9.89	167.86
2005	Added E/F less Replaced C/D Operations	285.39	266.94	1,287.21	8.41	130.34
	Added E/F less Replaced C/D Run-Ups	14.00	14.31	76.43	0.48	7.12
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2005 CAA Conformity Total	320.04	300.01	1,685.13	9.37	157.13
2006	Added E/F less Replaced C/D Operations	265.56	261.64	1,269.62	7.89	119.82
	Added E/F less Replaced C/D Run-Ups	13.74	14.85	80.06	0.48	6.92
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2006 CAA Conformity Total	299.95	295.25	1,671.17	8.85	146.41
2007	Added E/F less Replaced C/D Operations	245.73	256.34	1,252.03	7.37	109.29
	Added E/F less Replaced C/D Run-Ups	13.49	15.39	83.69	0.47	6.72
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2007 CAA Conformity Total	279.87	290.49	1,657.21	8.32	135.69

TABLE E-102. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
2008	Added E/F less Replaced C/D Operations	225.91	251.04	1,234.44	6.85	98.77
	Added E/F less Replaced C/D Run-Ups	13.23	15.93	87.32	0.47	6.52
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2008 CAA Conformity Total	259.79	285.72	1,643.25	7.80	124.97
2009	Added E/F less Replaced C/D Operations	201.52	243.03	1,204.60	6.20	85.83
	Added E/F less Replaced C/D Run-Ups	12.84	16.39	90.58	0.46	6.25
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2009 CAA Conformity Total	235.02	278.17	1,616.67	7.14	111.76
2010	Added E/F less Replaced C/D Operations	177.14	235.02	1,174.75	5.55	72.89
	Added E/F less Replaced C/D Run-Ups	12.46	16.85	93.85	0.45	5.98
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.06	6.48	103.91	0.18	18.45
	Added Government Vehicle Use	0.16	0.15	1.22	0.00	0.46
	2010 CAA Conformity Total	210.25	270.62	1,590.08	6.48	98.55

TABLE E-102. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
	Maximum Phase 1/Phase 2 CAA Conformity Analysis Emissions	340.12	304.77	1,699.09	10.31	167.86
	De Minimis Threshold	50.00	50.00	na	na	70.00
	Above De Minimis Level?	YES	YES	NO	NO	YES
	Reserved Conformity Offsets	100.00	367.10	na	na	151.60
	FAA Transfer of Conformity Offsets	218.28	0.00	0.00	0.00	0.00
	Net Conformity Emissions Change	21.84	(62.33)	1,699.09	10.31	16.26
	Balance After Interpollutant Trade	0.00	(24.24)	na	na	0.00

Notes: na = not applicable; conformity requirements apply only to nonattainment pollutants.
Construction emission estimates assume all aircraft-related facilities, one BEQ, and 100 units of family housing will be constructed in 1999. Other housing and personnel support facility construction is assumed to occur in stages during 2000-2002.
Phase 1 analyses assume that 20 FRS aircraft will arrive in 2000 and 16 FRS aircraft will arrive in 2001; in addition, one fleet squadron will arrive each year from 2000 through 2003.
Phase 2 aircraft arrivals will be one-for-one replacements of F/A-18C/D aircraft that are already based at NAS Lemoore, with aircraft for one squadron replaced each year from 2005 through 2010. In addition, 26 F/A-18C/D FRS squadron aircraft will be eliminated.
In-frame engine run-up emission estimates assume 58.5 low power run-ups (12.5 minutes) per aircraft per year plus 3.5 high power run-ups (31 minutes) per aircraft per year. Each run-up event tests a single engine.
Aircraft refueling emission estimates are based on 80% splash loading of aircraft fuel tanks at fuel pit facilities and 20% splash loading of fuel trucks with subsequent splash loading of aircraft; emission rates reflect monthly temperature patterns at NAS Lemoore.
Aircraft support equipment includes tow tractors, weapons hoists, hydraulic test stands, air start units, air conditioning units, generators, compressors, etc.
On-base natural gas use includes space heating and water heating for residential, office, and industrial buildings that do not have central boilers large enough to require APCD permits. Emissions are less than 0.005 tons per year for any pollutant.
Personal vehicle work trip emissions are based on 240 work days per year.
Added government vehicle use emissions based on 4 added vehicles for the FRS squadron and 1 added vehicle for each added fleet squadron.
Vehicle travel emission estimates were calculated for full Phase 1 conditions; intermediate year vehicle emissions were estimated as a percent of 2003 emissions: 50% for 2000, 65% for 2001, and 80% for 2002. Phase 2 aircraft arrivals will not produce further increases in personnel.
Reserved conformity offsets for NAS Lemoore were established when Castle Air Force Base closed.

TABLE E-102. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

Additional conformity offsets established by the closure of Castle Air Force Base are being transferred to NAS Lemoore by the Federal Aviation Administration.

Interpollutant offsets (using NOx to offset PM10 and reactive organic compounds) achieve the required ozone precursor and PM10 precursor reductions.

Data Sources:

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U.S. Department of Transportation
Federal Aviation Administration

800 Independence Ave., S.W
Washington, D.C. 20591

FEB 27 1998

Ms. Elsie L. Munsell
Deputy Assistant Secretary of the Navy
(Environment and Safety)
1000 Navy Pentagon, Room 4A686
Washington, DC 20350-1000

Dear Ms. Munsell:

This is in response to your recent letter requesting that the Federal Aviation Administration (FAA) transfer the mobile source conformity offsets we hold as a result of the closure of Castle Air Force Base (AFB), California, to the Navy for use at Naval Air Station (NAS) Lemoore.

Members of my staff here in Washington, as well as our Regional office in Los Angeles, have examined your request. We are of the opinion that the transfer of 206.2 tons of reactive organic gases (ROG), as well as an additional 12.08 tons of ROG to satisfy your need to offset 12.08 tons of particulate (PM10) emissions, would not impact the foreseeable development plans for Castle Airport. Based on the Navy's understanding of the Air District's position on how to offset PM10 emissions, we would prefer to provide you with ROG rather than oxides of nitrogen (NOx) credits to handle that offset. Therefore, I concur with your request and propose to transfer 218.28 tons of ROG to the Navy for use in making a positive conformity determination for your proposed action at NAS Lemoore.

At this time, I think it is premature to consider the transfer to the Navy of all remaining conformity offsets (2,092.92 tons of ROG and 642.7 tons of NOx), to be banked for future potential Navy growth in the San Joaquin Valley. The emission reduction credits provided to the FAA by the United States Air Force (USAF) were for the purpose of assisting in the civil redevelopment of Castle AFB. This redevelopment is likely to result in increases in air emissions that may require part or all of these credits. We would expect future Navy growth proposals at NAS Lemoore to seriously consider and pursue other means of meeting air quality conformity.

Before considering any decision on the transfer of additional offsets, the FAA would need to have a better understanding of the Navy's need and why such a transfer is the only practical or achievable option available to the Navy. The FAA must also be responsible for considering and weighing the forecasted needs of Castle Airport in any decision. If other means of demonstrating conformity are not available to the Navy, at that point we could discuss possibilities of transferring additional offsets based on specific needed amounts.

Please advise us when you are ready to move forward with the transfer of the 218.28 tons of ROG and whether additional documentation from the FAA is needed to effect the transfer. We will inform the USAF and the Castle Joint Powers Authority of the transfer, once it becomes effective.

Sincerely,

Susan L. Kurland

Susan L. Kurland
Associate Administrator
for Administration

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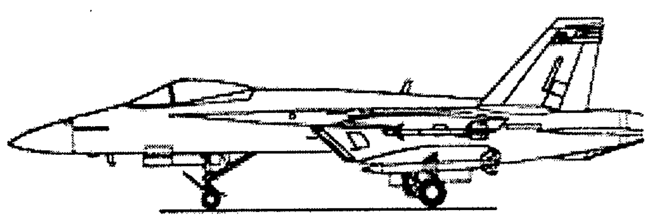

EMISSIONS SUMMARY FOR CLENA AIR ACT CONFORMITY DETERMINATION, NAF EL CENTRO ALTERNATIVE

TABLE E-103. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
1999	Construction Activity	3.52	51.00	24.42	5.09	29.99
	1999 CAA Conformity Total	3.52	51.00	24.42	5.09	29.99
2000	Construction Activity	1.56	22.78	10.41	2.30	13.30
	F/A-18 E/F Operations	138.24	129.39	591.23	4.20	65.90
	F/A-18 E/F Engine Run-Ups	5.27	5.09	26.90	0.18	2.71
	Aircraft Refueling	0.30	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	4.95	5.49	97.95	0.14	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	4.65	2.69	33.80	0.07	7.56
	Added Government Vehicle Use	0.09	0.08	0.60	0.00	0.23
	2000 CAA Conformity Total	155.07	165.52	760.89	6.88	90.05
2001	Construction Activity	0.91	13.42	6.06	1.36	6.96
	F/A-18 E/F Operations	253.95	236.48	1086.09	7.68	120.64
	F/A-18 E/F Engine Run-Ups	9.92	9.58	50.64	0.34	5.09
	Aircraft Refueling	0.56	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	9.10	10.09	179.95	0.25	0.63
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	6.05	3.50	43.93	0.09	9.83
	Added Government Vehicle Use	0.12	0.10	0.78	0.00	0.30
	2001 CAA Conformity Total	280.62	273.17	1,367.46	9.72	143.45
2002	Construction Activity	0.87	12.70	5.76	1.28	6.73
	F/A-18 E/F Operations	279.58	254.36	1195.45	8.30	130.75
	F/A-18 E/F Engine Run-Ups	12.09	11.67	61.72	0.41	6.21
	Aircraft Refueling	0.65	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.02	11.11	198.15	0.28	0.69
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	7.45	4.31	54.07	0.12	12.10
	Added Government Vehicle Use	0.15	0.12	0.96	0.00	0.37
	2002 CAA Conformity Total	310.80	294.28	1,516.11	10.39	156.85

TABLE E-103. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
2003, 2004	F/A-18 E/F Operations	305.21	272.24	1304.81	8.92	140.86
	F/A-18 E/F Engine Run-Ups	14.25	13.77	72.80	0.48	7.32
	Aircraft Refueling	0.73	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	10.94	12.13	216.35	0.30	0.76
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	9.31	5.39	67.59	0.15	15.12
	Added Government Vehicle Use	0.19	0.15	1.20	0.00	0.46
	2003 CAA Conformity Total	340.63	303.67	1,662.74	9.86	164.53
2005	Construction Activity	1.72	24.34	12.19	2.41	12.27
	F/A-18 E/F Operations	327.19	287.56	1398.55	9.46	149.53
	F/A-18 E/F Engine Run-Ups	16.11	15.57	82.29	0.55	8.27
	Aircraft Refueling	0.80	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	11.49	12.73	227.15	0.31	0.79
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	10.62	6.13	76.98	0.17	17.21
	Added Government Vehicle Use	0.22	0.18	1.41	0.01	0.55
	2005 CAA Conformity Total	368.14	346.50	1,798.57	12.90	188.63
2006	Construction Activity	2.26	32.27	15.44	3.24	18.16
	F/A-18 E/F Operations	349.16	302.88	1492.29	9.99	158.19
	F/A-18 E/F Engine Run-Ups	17.97	17.36	91.79	0.61	9.23
	Aircraft Refueling	0.87	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	12.03	13.33	237.96	0.33	0.82
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	11.92	6.88	86.36	0.19	19.30
	Added Government Vehicle Use	0.25	0.20	1.62	0.01	0.63
	2006 CAA Conformity Total	394.46	372.93	1,925.46	14.36	206.33
2007	Construction Activity	1.73	24.89	12.53	2.47	12.96
	F/A-18 E/F Operations	371.13	318.21	1586.03	10.52	166.86
	F/A-18 E/F Engine Run-Ups	19.83	19.16	101.29	0.67	10.18
	Aircraft Refueling	0.94	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	12.57	13.92	248.77	0.34	0.86
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	13.23	7.62	95.75	0.21	21.39
	Added Government Vehicle Use	0.29	0.23	1.83	0.01	0.71
	2007 CAA Conformity Total	419.72	384.03	2,046.19	14.22	212.97

TABLE E-103. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
2008	Construction Activity	0.87	12.85	6.07	1.28	6.32
	F/A-18 E/F Operations	393.10	333.53	1679.77	11.06	175.53
	F/A-18 E/F Engine Run-Ups	21.69	20.95	110.78	0.74	11.14
	Aircraft Refueling	1.01	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	13.12	14.52	259.57	0.36	0.89
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	14.54	8.37	105.13	0.23	23.48
	Added Government Vehicle Use	0.32	0.26	2.04	0.01	0.79
	2008 CAA Conformity Total	444.64	390.49	2,163.37	13.66	218.15
2009	Construction Activity	0.87	12.85	6.07	1.28	5.96
	F/A-18 E/F Operations	415.07	348.85	1773.52	11.59	184.19
	F/A-18 E/F Engine Run-Ups	23.55	22.75	120.28	0.80	12.09
	Aircraft Refueling	1.08	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	13.66	15.12	270.38	0.37	0.92
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	15.85	9.11	114.52	0.25	25.57
	Added Government Vehicle Use	0.35	0.28	2.26	0.01	0.88
	2009 CAA Conformity Total	470.43	408.98	2,287.01	14.30	229.61
2010	F/A-18 E/F Operations	437.05	364.18	1867.26	12.12	192.86
	F/A-18 E/F Engine Run-Ups	25.41	24.55	129.77	0.86	13.05
	Aircraft Refueling	1.15	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	14.20	15.72	281.18	0.39	0.95
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Personal Vehicle Work Trips	17.16	9.86	123.90	0.27	27.66
	Added Government Vehicle Use	0.39	0.31	2.47	0.01	0.96
	2010 CAA Conformity Total	495.35	414.62	2,404.58	13.65	235.48

TABLE E-103. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

		ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
YEAR	EMISSIONS COMPONENT	REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
	Maximum Phase 1/Phase 2 CAA Conformity Analysis Emissions	495.35	414.62	2,404.58	14.36	235.48
	De Minimis Threshold	100.00	100.00	na	na	100.00
	Above De Minimis Level?	YES	YES	NO	NO	YES
	Emissions Growth Included in SIP	0.00	0.00	0.00	0.00	0.00
	Other Available Offsets	0.00	0.00	0.00	0.00	0.00
	Net Conformity Emissions Change	495.35	414.62	2,404.58	14.36	235.48
	Conformity Offset Requirements	495.35	414.62	na	na	235.48

Notes: na = not applicable; conformity requirements apply only to nonattainment pollutants.
Construction emission estimates for Phase 1 assume all aircraft-related facilities, one BEQ, the BOQ, and 100 units of family housing will be constructed in 1999. Other Phase 1 housing and personnel support facility construction is assumed to occur in stages during 2000-2002.
Construction emission estimates for Phase 2 assume that additional aircraft maintenance and training facilities plus 75 units of family housing will be constructed in 2005. Other equipment storage, warehousing, administrative offices, housing, and personnel support facilities are assumed to be constructed in stages between 2009.
Phase 1 analyses assume that 20 FRS aircraft will arrive in 2000 and 16 FRS aircraft will arrive in 2001; in addition, one fleet squadron will arrive each year from 2000 through 2003.
Phase 2 analyses assume that one fleet squadron will arrive each year from 2005 through 2010.
In-frame engine run-up emission estimates assume 58.5 low power run-ups (12.5 minutes) per aircraft per year plus 3.5 high power run-ups (31 minutes) per aircraft per year. Each run-up event tests a single engine.
Aircraft refueling emission estimates are based on 80% splash loading of aircraft fuel tanks at fuel pit facilities and 20% splash loading of fuel trucks with subsequent splash loading of aircraft; emission rates reflect monthly temperature patterns at NAF El Centro.
Aircraft support equipment includes tow tractors, weapons hoists, hydraulic test stands, air start units, air conditioning units, generators, compressors, etc.
On-base natural gas use includes space heating and water heating for residential, office, and industrial buildings that do not have central boilers large enough to require APCD permits. Emissions are less than 0.005 tons per year for any pollutant.
Personal vehicle work trip emissions based on 240 work days per year.
Added government vehicle use emissions based on 4 added vehicles for the FRS squadron and 1 added vehicle for each fleet squadron.
Phase 1 vehicle travel emission estimates were calculated for 2003 conditions; intermediate year vehicle emissions were estimated as a percent of 2003 emissions: 50% for 2000, 65% for 2001, and 80% for 2002.

TABLE E-103. ANNUAL CONFORMITY EMISSIONS FROM F/A-18E/F SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

Phase 2 vehicle travel emission estimates were calculated for 2010 conditions; intermediate year vehicle emissions were estimated as Phase 1 emissions plus one-sixth of the Phase 2 increment for each year between 2005 and 2010.

Data Sources:

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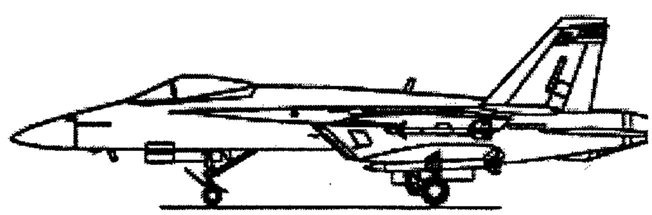

APPENDIX F
NOISE

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F.2 NOISE IMPACT CALCULATIONS FOR FLYOVER EVENTS F-7

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APPENDIX F
NOISE

F.1 INTRODUCTION

Sound is caused by vibrations that generate waves of minute air pressure fluctuations in the air. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second or Hertz. Different vibrational frequencies produce different tonal qualities for the resulting sound.

Sound level meters typically report measurements as a single composite decibel (dB) value. Decibel scales are a logarithmic index based on ratios between a measured value and a reference value. In the field of acoustics, decibel scales are proportional to the logarithm of ratios between the actual pressure fluctuations generated by sound waves compared to a standard reference pressure value of 20 micropascals (0.000000418 pounds per square foot or 0.0000000029 pounds per square inch). More specifically, a decibel is 10 times the logarithm of the squared pressure ratio, which is equal to 20 times the logarithm of the direct pressure ratio.

Measurements and descriptions of sounds are usually based on various combinations of the following factors:

- The vibrational frequency characteristics of the sound, measured as sound wave cycles per second (Hertz); this determines the "pitch" of a sound;
- The total sound energy being radiated by a source, usually reported as a sound power level;
- The actual air pressure changes experienced at a particular location, usually measured as a sound pressure level; the frequency

characteristics and sound pressure level combine to determine the "loudness" of a sound at a particular location;

- The duration of a sound; and
- The changes in frequency characteristics or pressure levels through time.

Modern sound level meters measure the actual air pressure fluctuations at a number of different frequency ranges, most often using octave or 1/3 octave intervals. The pressure measurements at each frequency interval are converted to a decibel index and adjusted for a selected frequency weighting system. The different adjusted decibel values for the octave or 1/3 octave bands are then combined into a composite sound pressure level for the appropriate decibel scale. Most sound level meters do not save or report the detailed frequency band pressure level measurements. A more sophisticated and expensive instrument (a spectrum analyzer) is required to obtain dB measurements for discrete frequency bands.

F.1.1 General Purpose Decibel Scales

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hertz, and is least sensitive to sound frequencies below 400 Hertz or above 12,500 Hertz. Consequently, several different frequency weighting schemes have been used to approximate the way the human ear responds to noise levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose, with different dB adjustment values specified for each octave or 1/3 octave interval. The A-weighted scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure level for some middle frequency sounds. Table F-1 summarizes typical dBA levels for various noise sources and noise conditions.

Other frequency weighting schemes are used for specialized purposes. The "C-weighted" decibel scale (dBC) is often used to characterize low frequency sounds capable of inducing vibrations in buildings or other structures. The C-weighted scale makes only minor reductions to the measured pressure level for low frequency components of a sound while making slightly greater reductions to high frequency components than does the A-weighted scale.

Unweighted decibel measurements are frequently used for refined analyses that require data on the frequency spectrum of a sound (e.g., when determining the sound absorption or sound transmission properties of materials). Unweighted decibel measurements are sometimes termed flat or linear measurements. The term "overall sound pressure level" (OASPL) is sometimes used as a technical term to describe unweighted decibel measurements. Unfortunately, the phrase "overall sound pressure level" also is sometimes used in a generalized sense to refer to composite dBA or dBC measurements. For most noise sources,

unweighted dB measurements are less than 1 dB higher than corresponding C-weighted dB measurements.

Evaluations of blast noise or sonic boom events sometimes use a peak overpressure measurement. The peak overpressure is normally an unweighted decibel measurement for the dominant octave band or 1/3 octave band component of a sound. The specific octave or 1/3 octave band measured is seldom reported. The peak overpressure level will be slightly less than the corresponding composite unweighted decibel measurement.

Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (L_{eq}) are not a simple averaging of decibel values, but are based on the cumulative acoustical energy associated with the component decibel values. L_{eq} values are sometimes referred to as energy-averaged noise levels. As a consequence of the calculation procedure, high dB events contribute more to the L_{eq} value than do low dB events.

L_{eq} values are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for potential annoyance due to time of day or other considerations. The L_{eq} data used for these average noise exposure descriptors are generally based on A-weighted sound level measurements.

Statistical descriptions (L_x, where x represents the percent of the time when noise levels exceed the specified decibel level) are also used to characterize noise conditions over specified periods of time. L_1, L_5, and L_{10} descriptors are commonly used to characterize peak noise levels, while L_{90}, L_{95}, and L_{99} descriptors are commonly used to characterize "background" noise levels. It should be noted that the L_{50} value (the sound level exceeded 50 percent of the time) will seldom be the same as the L_{eq} value for the period being analyzed. The L_{eq} value is often between the L_{30} and the L_{40} values for the measurement period.

F.1.2 Decibel Scales Reflecting Annoyance Potential

Average noise exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10 p.m. - 7 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. Because of the time period weighting, an L_{dn} value will be 6.4 dB greater than the corresponding 24-hour L_{eq} value for a constant noise level. For most real noise conditions, the corresponding L_{dn} and 24-hour L_{eq} values will differ by less than this.

The community noise equivalent level (CNEL) is also used to characterize average noise levels over a 24-hour period, with weighting factors for evening and nighttime noise levels. L_{eq} values for the evening period (7 p.m. - 10 p.m.) are increased by 5 dB while L_{eq} values for the nighttime period (10 p.m. - 7 a.m.) are increased by 10 dB. Because of the time period weighting, a CNEL value will be

6.7 dB higher than the corresponding 24-hour L_{eq} value for a constant noise level. For most real noise conditions, the corresponding CNEL and 24-hour L_{eq} values will differ by less than this.

The CNEL value will be slightly higher than (but generally within 1 dB of) the L_{dn} value for the same set of noise measurements. Only in situations with high evening period noise levels will CNEL values be meaningfully different from L_{dn} values. Because of the small difference between them, CNEL and L_{dn} ratings are normally considered interchangeable.

Single-value average noise descriptors (such as L_{dn} or CNEL values) are commonly applied to variable but relatively frequent sources of noise. Typical urban noise conditions, highway traffic, major rail yards, heavily used rail lines, and major commercial airports are examples where CNEL and L_{dn} descriptors are most appropriate.

F.1.3 Noise Descriptors for Discrete Noise Events

Many people are skeptical about using 24-hour average noise descriptors to evaluate the annoyance potential of isolated short-duration noise events. Although this skepticism is often misplaced, other types of noise evaluations can be used. Lightly used rail lines, aircraft activity at small general aviation airports, testing of emergency generators, pile driving, and blasting activities sometimes are evaluated using other types of noise descriptors. Peak noise levels, the duration of individual noise events, and the repetition pattern of events are often used to describe intermittent or short duration noise conditions. Statistical descriptions (L_x values) and event-specific L_{eq} values also can be used to characterize discrete noise events.

Impulse sounds usually are defined as noise events producing a significant increase in sound level but lasting less than two seconds (often less than one second). Examples of impulse noise sources include pile driving, punch presses, gunshots, fireworks, sonic booms, and blasting activities. Impulse noises are usually described using the sound exposure level (SEL) descriptor. The SEL measure represents the cumulative (not average) sound exposure during a particular noise event, integrated with respect to a one-second time frame.

Individual noise events of greater duration sometimes are characterized using the single event noise exposure level (SENEL) descriptor. The SENEL of a noise event is calculated as the cumulative A-weighted sound exposure during a discrete noise event, integrated with respect to a one-second time frame.

Mathematically, the SEL and SENEL descriptors are the same (Peasons and Bennett 1974). SEL and SENEL measurements are equivalent to the L_{eq} value of a one-second noise event producing the same cumulative acoustic energy as the actual noise event being analyzed. In effect, an SEL or SENEL measure "spreads" or "compresses" the noise event to fit a fixed one-second time interval. If the

actual duration of the noise event is less than one second, the SEL or SENEL value will be less than the L_{eq} value for the event. If the duration of the noise event exceeds one second, the SEL or SENEL value will exceed the L_{eq} of the event.

In practice, the SENEL descriptor implies an A-weighted basis, while SEL descriptors often use other decibel weighting schemes. Impulse noises of substantial magnitude (e.g., blasting or sonic booms) often are characterized using unweighted (flat) or C-weighted SEL measures. Annoyance from such sources often involves induced structural vibrations as well as the loudness of the noise event. Unweighted and C-weighted decibel scales have proven more useful than the A-weighted scale for such evaluations. Less intense impulse noises often are characterized using an A-weighted SEL measure. In recent years, the SEL acronym has tended to replace the SENEL acronym in technical noise reports, regardless of the decibel weighting scheme being used.

Most SEL and SENEL measurements are performed using procedures that restrict the time interval over which actual measurements or subsequent calculations are made. Sometimes this involves defining the noise event as the period when sound levels exceed a particular threshold level. In other cases, the calculations are restricted to that portion of the noise event when sound levels are within a defined increment (generally 10 to 30 dB) of the peak sound level. The measurement restrictions noted above are done as a practical expediency to minimize manual computations, to accommodate monitoring instruments with a limited measurement range, or to systematically define discrete noise events against fluctuating background noise conditions. Due to the logarithmic nature of decibel units, these measurement restrictions normally have little effect on the calculated SEL value.

If individual noise events are repeated frequently, it is possible to calculate L_{dn} or CNEL values based on typical SEL or SENEL values and the number of occurrence of such noise events during daytime, evening, and nighttime periods. Such computation procedures often are used to evaluate airport noise.

A slightly modified version of the L_{dn} and CNEL calculations is often used in computer models that evaluate aircraft noise along military training routes. An additional penalty factor of up to 5 dB is added to the standard L_{dn} or CNEL calculation to account for the added disturbance caused by very rapid increases in noise level during flyover events. The resulting "onset rate adjusted" L_{dn} or CNEL value is often designated as L_{dnmr}. The magnitude of the added penalty factor depends on flight speed, flight altitude, and aircraft type.

F.1.4 Working With Decibel Values

The nature of dB scales is such that numerical dB ratings for different noise sources cannot be added directly to give the dB rating of the combination of these sources. Decibel values are 10 times the logarithm of a squared pressure ratio, and

must be converted back into squared pressure ratio values before being added together or averaged in a time-weighted manner. The resulting composite squared pressure ratio value can then be converted back into a composite decibel rating. For simplicity, the procedure for combining decibel values is often referred to as "energy averaging".

Time-Weighted Averages. The calculation procedure used for computing average noise levels (L_{eq} values) results in high dB events contributing significantly more to the final L_{eq} value than do background low dB conditions. For example, a single 1-second episode of 90 dBA introduced into a 1-hour constant background noise condition of 45 dBA will result in a 1-hour L_{eq} value of 54.9 dBA. A 5-second episode of 90 dBA in a 1-hour background condition of 45 dBA results in a 1-hour L_{eq} of 61.5 dBA. And a cumulative total of 20 seconds of 90 dBA in a background condition of 45 dBA results in a 1-hour L_{eq} of 67.5 dBA.

Even in the context of 24-hour averages, brief noise events have a noticeable effect. A 5-second episode of 90 dBA in a 24-hour background condition of 45 dBA raises the 24-hour L_{eq} to 49.5 dBA. A cumulative total of 20 seconds of 90 dBA in a 24-hour background condition of 45 dBA results in a 24-hour L_{eq} of 54.2 dBA.

Cumulative Effect of Multiple Noise Sources. Two noise sources producing equal dB ratings at a given location will produce a composite noise level 3 dB greater than either sound alone. When two noise sources differ by 10 dB, the composite noise level will be only 0.4 dB greater than the louder source alone. Even in a laboratory setting, most people have difficulty distinguishing the louder of two noise sources that differ by less than 1.5-2 dB.

Decibel Changes Versus Perceived Loudness. In general, a 10 dB increase in noise level is perceived as a doubling (100 percent increase) in loudness. A 2 dB increase represents a 15 percent increase in loudness, a 3 dB increase is a 23 percent increase in loudness, and a 5 dB increase is a 41 percent increase in loudness. Conversely, a 2 dB reduction represents a 13 percent decrease in loudness, a 3 dB reduction represents a 19 percent decrease in loudness, a 5 dB reduction represents a 29 percent decrease in loudness, and a 10 dB reduction represents a 50 percent decrease in loudness.

Sound Attenuation Considerations. When distance is the only factor considered, sound levels from an isolated noise source would be expected to decrease by about 6 dB for every doubling of distance away from the noise source. When the noise source is essentially a continuous line (e.g., vehicle traffic on a highway), noise levels would be expected to decrease by about 3 dB for every doubling of distance, due to the additive effects of a linear array of noise sources.

Sound levels at various locations away from a noise source are influenced by factors other than just distance from the noise source. Ground surface

conditions, topographic features, and structural barriers can absorb, reflect, or scatter sound waves, resulting in lower noise levels (increased sound attenuation rates). Atmospheric conditions (wind speed and direction, humidity levels, temperature, and air pressure) and the frequency characteristics of the sound itself also affect sound attenuation rates. The vertical variation in wind, temperature, pressure, and humidity conditions also affects sound attenuation rates.

The atmosphere absorbs some of the energy content of sound waves, thus increasing sound attenuation rates over long distances. Such atmospheric absorption is greatest for high frequency components of a sound, resulting in a lower pitch to the sound at greater distances. Atmospheric absorption is most strongly dependent on temperature and humidity conditions, with a somewhat complex relationship among temperature, humidity, and the frequency components of the sound.

Overall, atmospheric absorption is greatest for high frequency sounds under conditions of low relative humidities and moderately cool temperatures. Atmospheric absorption is least for low frequency sounds at high relative humidities and moderate temperatures.

Sound waves reflected by topographic features, buildings, or other structures can result in higher sound levels than expected in front of the reflecting object. The effects of reflected sound waves can be important in urban areas, partially off-setting the shielding effect of buildings and other structures.

Temperature inversions and altitudinal changes in wind conditions can at times diffract and "focus" sound waves to a location at considerable distance from the noise source. In such situations, the vertical changes in atmospheric conditions affect sound waves much the way lenses and prisms can bend and focus light rays.

F.2 NOISE IMPACT CALCULATIONS FOR FLYOVER EVENTS

Several types of noise analyses have been used in this EIS to characterize aircraft noise associated with various aspects of the proposed action. Computer modeling of annual average CNEL contours was performed by Wyle Laboratories to evaluate noise conditions in the vicinity of NAS Lemoore and NAF El Centro. The airfield vicinity CNEL contours are presented in Chapters 3, 4, and 5 of Volume I of this EIS.

Additional computer modeling of L_{dnmr} levels has been performed by Wyle Laboratories to evaluate noise conditions along specific flight corridors used to reach training areas in the R-2508 Complex and in the NAF El Centro area. Results of the flight corridor noise modeling analyses are presented in a subsequent section of this appendix.

The CNEL and L_{dn} analyses have been supplemented by time history simulations of individual flyover event conditions. The procedures used for these supplemental flyover event analyses are discussed below.

F.2.1 Available Data

Most data on noise levels from military aircraft are presented as A-weighted SEL values at different slant distances from the flight path of an aircraft flying at a relatively low altitude. Noise monitoring is generally done for several power settings and air speeds. The reported SEL values are typically computed for the time interval when noise levels are within 10 dBA of the peak level. SEL data tables have been published for several types of aircraft used by the Navy (US Navy 1984). Updated data are available from noise models used to evaluate aircraft noise at military airfields and along military aircraft flight corridors. Current data from computerized aircraft noise models (Czech 1998) have been used for the analyses presented in this EIS.

The SEL data used for this EIS come from current versions of the NOISEFILE database and the OMEGA10 computer model. The NOISEFILE database contains SEL data measured for selected flight configurations and air speeds. The OMEGA10 computer model uses data from the NOISEFILE database to estimate SEL data for an array of slant distances from the aircraft fight path according to power setting, air speed, and drag configuration. Flight conditions typically evaluated include takeoffs (with or without afterburners), military power settings (with or without afterburners), cruise power settings, holding pattern power settings, and approach power settings.

F.2.2 General Approach

While SEL data simplify certain types of acoustical calculations, caution is required when comparing different noise sources in terms of SEL values. SEL values are not direct indicators of peak noise levels or disturbance potential. The real duration of noise events must always be considered when trying to compare SEL values for different noise sources. A brief noise event with a high peak noise level may yield a lower SEL value than an extended noise event with a moderate peak noise level.

Compared to corresponding SEL values, a dBA time history profile provides a more understandable description of discrete noise events. A dBA time history provides a complete description of a noise event, and allows any other noise metric (including SEL values) to be calculated. Most importantly, it allows both peak and average noise levels to be estimated and compared to other common noise sources and to various noise impact significance criteria.

Estimating the dBA time history profile for a location near the aircraft flight track is a critical step in the noise impact analysis. The dBA time history provides an estimate of peak dBA, which can then be extrapolated to other

distances from the flight track and compared to appropriate noise impact significance criteria.

A dBA time history can be derived from SEL data if the following information is either known or can be estimated with reasonable confidence:

- The duration of the noise event;
- The portion of the noise event when peak noise levels will occur;
- The general shape of the noise level rise to the peak;
- The general shape of the noise level decline from the peak; and
- The peak noise level of the event.

For aircraft flyover events, the duration of the event can be estimated from flight speeds and a generalized estimate of the distance at which the noise sources will first be heard. Peak noise levels will occur when the aircraft passes overhead. The general shape of the noise level rise to and decline from the peak level can be estimated with a variety of simple mathematical functions. Sine curves, logarithmic curves, and exponential curves are reasonable approximations for many types of noise events. Peak noise levels can then be estimated by iteration, using the measured SEL value as a control.

Development of dBA time histories from aircraft SEL data requires a fundamental assumption that aircraft SEL data provide a robust estimate of total acoustical energy generated at major engine power setting categories. If that assumption is reasonably valid, then it is possible to estimate dBA time history patterns for flight speed conditions that differ from the flight speed at which SEL data were measured. The SEL value used as a control value is assumed to be constant for a given power setting, regardless of air speed. Consequently, the only factors that vary are event duration (determined by air speed) and peak dBA (established by iteration and matching of the measured SEL value). Higher air speeds at a given power setting yield shorter event durations and higher peak dBA values.

The aircraft flyover event noise level analyses presented in this EIS required several steps: estimating flyover event durations, simulating flyover event time histories for a standardized slant distance, calibrating measured SEL data to a simple distance attenuation model, and estimating peak flyover event dBA at various slant distances.

F.2.3 Event Duration

The synthesis of dBA time histories from SEL data requires an estimate of the duration of the noise event that was measured for the SEL data. The SEL data tables (US Navy 1984) indicate aircraft power setting, flight speed, and slant distance.

Flyover event analyses assume that aircraft can be heard above background noise from a distance of 2 nautical miles (3.7 km). Flight speed then defines a nominal event duration. When flight speed is a significant fraction of the speed of sound, there will be only a brief time interval for the approach portion of the noise event (2 nautical miles at the speed of sound versus 2 nautical miles at flight speed). Consequently, the duration of the approach segment of the noise event requires adjustment for the time lag between the speed of sound and the speed of the aircraft. Speed of sound calculations incorporate temperature and relative humidity corrections.

Event duration estimates assume that the aircraft engines can be heard above background noise from a distance of 2 nautical miles (3.7 km). Flight speed provides the basis for estimating the duration of the flyover event. However, the overall event duration will be shorter than the time required for the aircraft to fly 4 nautical miles (4 km). This happens because jet aircraft can travel a significant distance in the time it takes sound to travel 2 nautical miles. The duration of the approach segment of the noise event will be the time lag between the arrival of sound initiated from 2 nautical miles (3.7 km) away and the arrival overhead of the aircraft. The duration of the departure segment of the noise event is simply the time it takes the aircraft to travel an additional 2 nautical miles (3.7 km).

The speed of sound in still air varies somewhat with temperature (Ford 1987) and slightly with relative humidity (Weast 1980). The speed of sound in still air increases by about 0.74 mph (1.2 kph) for every 1 degree Fahrenheit increase in air temperature. The humidity effect is much smaller, amounting to an increase of about 2 mph when the relative humidity increases from 0 percent to 100 percent. Figure F-1 illustrates how the speed of sound varies with temperature and relative humidity.

Overflight noise events are an important issue for users of National Parks, wilderness areas, and other recreational lands affected by military flight corridors and training ranges. Recreational use of backcountry areas in the Sierra Nevada is concentrated in summer and fall months. Recreational use of desert areas is generally concentrated in fall, winter, and spring months. Speed of sound calculations used for the overflight noise analysis are based on an air temperature of 60 degrees Fahrenheit and a relative humidity of 40 percent. The speed of sound under these conditions is 663 knots (1,228 kph). Table F-2 summarizes flyover event durations at various aircraft speeds for a 4 nautical mile (7.4 km) flight path during which noise is audible.

F.2.4 Flyover Profile Simulation

The noise event time history simulation model used for this EIS divides the overall flyover event into 25 time intervals. The background noise level is assumed to be 40 dBA. The difference between the background noise level and the peak noise level represents the amplitude of the noise event. The simulation

model can accommodate either symmetrical or asymmetrical noise event profiles. Asymmetrical profiles have been used for the flyover event simulation.

Peak noise conditions are assumed to last for one time interval. The placement of the peak interval is based on the duration of the approach segment of the overall noise event. The noise level rise to the peak and the noise level decline from the peak are modeled using mathematical functions that distribute the noise event amplitude over the available time intervals. The noise event simulation model has three pre-programmed functions available for the noise level rise to the peak: a sine curve function, a reversed sine curve function, and an exponential function. Two pre-programmed functions are available for the noise level decline from the peak: a logarithmic function and a sine curve function.

The choice of distribution functions for the approach segment should recognize two factors: the directionality of the noise source, and its height above ground level. Turboprop aircraft and aircraft with wing-mounted jet engines tend to have little directionality in their noise generation patterns. Aircraft with engines in the rear of the fuselage radiate noise more strongly behind the aircraft than in front of it, as shown by directionality plots presented in the SEL data compilation (US Navy 1984).

The lower the flight path of such aircraft, the closer the aircraft must be before the zone of highest noise levels passes over any given location. The reversed sine curve and exponential functions simulate this effect with a rapid increase in noise levels just prior to the peak. The reversed sine curve provides a somewhat more gradual increase to the peak than does the exponential function, and has been used for the all flyover event analyses.

With the event duration defined and appropriate curve types programmed, the peak dBA value is the only remaining factor needed to fully define the event profile. Peak dBA values are identified by iteration, matching the simulated event SEL to the measured SEL value. Only the portion of the simulated time history that falls within 10 dBA of the peak noise level was used for the SEL control value check.

For any basic power setting (takeoff, cruise, or approach power), the simulation can be repeated at various flight speeds. In each case, the SEL value used for calibration is assumed to be constant for a given power setting, regardless of air speed. Consequently, the only factors that vary are event duration (defined by air speed) and peak dBA (established by iteration and matching of the measured SEL value). Higher air speeds at a given power setting yield shorter event durations with higher peak dBA values.

Table F-3 summarizes the SEL and peak dBA values for F/A-18C/D aircraft at a standardized distance of 1,000 feet (305 m) under various power settings and air speeds. Table F-4 provides a similar data for F/A-18E/F aircraft. Some of the

SEL values in Tables F-3 and F-4 come directly from a database of measured noise levels. Other SEL values in Tables F-3 and F-4 were generated by the OMEGA10 computer model or extrapolated based on the sensitivity of SEL data to power settings. The peak dBA values in Tables F-3 and F-4 were all derived from the time history simulation methodology discussed above.

As can be seen most clearly from Table F-4, the computations in the OMEGA10 program have the practical effect of adjusting SEL values while keeping peak dBA levels essentially constant as air speeds change within a given power setting configuration. The simulation analyses presented in this appendix take a somewhat more conservative approach by holding the SEL values constant and adjusting the peak dBA value as air speeds change within a given power setting configuration.

Table F-5 provides a direct comparison of noise levels at comparable flight conditions for F/A-18C/D versus F/A-18E/F aircraft. In general, the F/A-18E/F aircraft uses lower power settings than the F/A-18C/D aircraft for comparable flight conditions. At high power settings (takeoff conditions and high speed military and afterburner flight) the F/A-18E/F aircraft is somewhat quieter than the F/A-18C/D aircraft. At low power settings, (holding patterns and landing approaches) the F/A-18E/F aircraft is somewhat noisier than the F/A-18C/D aircraft.

As is indicated in Tables F-3 and F-4, a large number of time history simulations were performed for flyover events at the standardized slant distance of 1,000 feet (305 m). A few of these simulations are presented as examples of this analysis. Table F- 6 and Figure F-2 show the simulation for an F/A-18C/D aircraft at a cruise power setting and 300 knots (556 kph) air speed. Table F-7 and Figure F-3 show the simulation for an F/A-18E/F aircraft at the same air speed and power setting category. At cruise power settings and an air speed of 300 knots (556 kph), the noise level rise to the peak is relatively gradual. This power setting and air speed condition is typical of flights between NAS Lemoore and major training ranges.

Table F-8 and Figure F-4 show the simulation for an F/A-18C/D aircraft at the low end of a military power setting and 420 knots (778 kph) air speed. Table F-9 and Figure F-5 show the simulation for an F/A-18E/F aircraft at the same air speed and power setting category. At military power settings and an air speed of 420 knots (778 kph), the noise level rise to the peak is rather abrupt. This power setting and air speed condition is typical of flights along low altitude military training routes.

Table F-10 and Figure F-6 show the simulation for an F/A-18C/D aircraft at a full military power setting and 420 knots (778 kph) air speed. Table F-11 and Figure F-7 show the simulation for an F/A-18E/F aircraft at the same air speed and power setting category. At a full military power setting and an air speed of

420 knots (778 kph), the noise level rise to the peak is rather abrupt. This power setting and air speed condition would be used at times within various training ranges.

Table F-12 and Figure F-8 show the simulation for an F/A-18C/D aircraft at an afterburner power setting and 500 knots (927 kph) air speed. Table F-13 and Figure F-9 show the simulation for an F/A-18E/F aircraft at the same air speed and power setting category. At an afterburner power setting and an air speed of 500 knots (927 kph), the noise level rise to the peak is very abrupt. This power setting and air speed condition would be used at times within various training ranges.

F.2.5 Distance Attenuation Calibration

SEL estimates for various slant distances (from the OMEGA10 model) were used to calibrate a basic two-factor noise attenuation model. The noise attenuation model calculates noise levels at various distances on the basis of a geometric noise drop-off rate and a linear atmospheric absorption rate. An iterative selection of parameter values was employed, using cumulative error statistics and graphical comparisons of measured versus calculated SEL drop-off curves to identify appropriate drop-off rate and atmospheric absorption parameters. The drop-off rate and atmospheric absorption parameters generated in this manner have been used to estimate peak dBA levels at various distances from the flight path.

Figures F-10 through F-13 illustrate the ability of the distance attenuation model to replicate the F/A-18C/D SEL data from the OMOEGA10 model. The holding pattern power setting calibration illustrated in Figure F-11 has been used in subsequent analyses as being representative of cruise power settings. Figures F-14 through F-17 provide a similar comparison for the F/A-18E/F SEL data. In general, the conventional two factor attenuation model produces noise estimates that are within 1 dBA of the data generated by the OMEGA10 model.

F.2.6 Modeled F/A-18 Peak Noise Level Versus Distance

The final computation for the flyover event noise analysis applied the calibrated noise attenuation model to estimate peak dBA values for various F/A-18C/D and F/A-18E/F power settings and air speeds.

Table F-14 summarizes the estimated peak and average dBA for F/A-18C/D and F/A-18E/F aircraft at various power settings, air speeds, and slant distances from the flight path. Takeoff, climbout, approach, and holding pattern power setting conditions would occur primarily in the vicinity of airfields. Cruise power settings would be used along flight corridors between military bases or between military bases and training ranges. Cruise, military, and afterburner power settings would occur within training range areas.

F.3 NOISE IMPACTS FOR FLIGHT CORRIDORS BETWEEN NAS LEMOORE AND THE R-2508 COMPLEX

F/A-18 aircraft conduct training exercises at several different locations. The major locations used include the R-2508 Complex in California, the Fallon training complex in Nevada, and training ranges in the NAF El Centro vicinity. Additional training exercises occur in off-shore ranges. Because the R-2508 Complex encompasses portions of several national parks and wilderness areas, aircraft overflight noise is an issue of concern in that area. Table F-15 summarizes existing and projected F/A-18C/D and F/A-18E/F use of the R-2508 Complex under the NAS Lemoore Alternative. Table F-16 provides a similar analysis of R-2508 use under the NAF El Centro Alternative.

There are currently two primary flight corridors connecting NAS Lemoore with the R-2508 Complex. These corridors are identified by the names assigned to the associated R-2508 access points (Kiote and Swoop). A third access point (Mitel) north of the Kiote access point is used primarily by the Air National Guard unit in Fresno. A fourth access point (Fangg) has been proposed north of the Mitel access point, near the northern boundary of the R-2508 Complex. The proposed Fangg access point is not yet approved by the FAA. Aircraft from NAS Lemoore normally enter the R-2508 Complex via one access point and return to NAS Lemoore using a different access point, thus separating aircraft flying in different directions at similar altitudes.

The eastern end of the flight corridors that enter the R-2508 Complex cross the Sierra Nevada mountains. The Swoop access point is over the Golden Trout Wilderness area near the southern boundary of Sequoia National Park. The Kiote access point is above the central part of Sequoia National Park. The proposed Fangg access point would have aircraft overfly the northern portion of Kings Canyon National Park, entering the R-2508 Complex over the John Muir Wilderness. NAS Lemoore aircraft using the Swoop and Kiote access corridors normally fly at 19,000 to 23,000 feet (5,791 to 7,010 m) msl. This results in overflights that are generally at least 6,000 feet (1,829 m) AGL. F/A-18 aircraft from NAS Lemoore normally fly these corridors at an air speed of 300 knots (556 kph) in a cruise power setting.

Existing NAS Lemoore air traffic along these corridors generates an annual average CNEL level well below 50 dBA (Wyle Laboratories 1998). F/A-18E/F aircraft added by Phase 1 of the proposed action would increase use of the Swoop and Kiote corridors by 69.5 percent. Because F/A-18E/F aircraft are noisier than F/A-18C/D aircraft when operated at cruise power conditions, the addition of F/A-18E/F aircraft operations on the Swoop and Kiote corridors would increase annual average CNEL levels by about 6 dBA. The resulting CNEL levels along the highest ridgelines would be between 50 and 55 dBA, with lower noise levels occurring at lower ground elevations (Wyle Laboratories 1998). If approved by the FAA, availability of the Fangg access point would redistribute most flights between NAS Lemoore and the R-2508 Complex over three primary corridors

rather than two, but the relative mix of flights along these corridors has not been determined.

Phase 2 of the proposed action would replace existing F/A-18C/D aircraft with F/A-18E/F aircraft. At the same time, an existing F/A-18C/D training squadron would be reduced from 36 aircraft to 10 aircraft. In addition, F/A-18E/F aircraft squadrons would make fewer sorties to the R-2508 Complex than do the existing F/A-18C/D squadrons. As a result, total annual F/A-18 aircraft sorties between NAS Lemoore and the R-2508 Complex would decline throughout the Phase 2 period. By the end of the Phase 2 period (2010), aircraft from NAS Lemoore would be expected to conduct 12,753 annual sorties to the R-2508 Complex, as compared to 9,900 sorties in 1997 and 16,785 sorties at the end of Phase 1 (2004). Annual average CNEL levels along the Swoop and Kiote corridors would be slightly lower at the end of Phase 2 than at the end of Phase 1.

Visitors to national park and wilderness areas will be affected by and respond to individual flyover events rather than annual average noise conditions. At the highest peaks and ridgelines along the flight corridors between NAS Lemoore and the R-2508 Complex (ground elevations of 13,000 to 14,000 feet [3,962 to 4,267 m]), the peak flyover event noise level for an F/A-18E/F aircraft would be about 79 dBA. Peak flyover event noise levels would be lower at locations below the highest ridgelines. At ground elevations between 9,000 and 10,000 feet (2,743 and 3,048 m), peak noise levels would be about 71-72 dBA. At ground elevations of between 6,000 and 7,000 feet (1,828 and 2,133 m), peak noise levels would be about 65 dBA. Peak noise levels would be about 3 dBA higher than those noted above if two aircraft fly in relatively close formation: 82 dBA for ridgelines or peaks at 13,000 - 14,000 feet (3,962 to 4,467 m); 74-75 dBA for ground elevations between 9,000 and 10,000 feet (2,743 and 3,048 m); and 68 dBA for ground elevations between 6,000 and 7,000 feet (1,828 and 2,133 m).

Although the peak flyover event noise levels would be higher than average background noise levels in national parks and wilderness areas, they are not substantially above the range of noise levels that can occur under natural conditions. For example, leaves or tall grass rustling in a moderate wind can generate sustained noise levels of 55 dBA. Strong winds can generate relatively sustained noise levels above 65 dBA, with peak noise levels being even higher (Cowan 1994).

F.4 NOISE IMPACTS WITHIN THE R-2508 COMPLEX

Once aircraft enter the R-2508 Airspace Complex, they come under the control of the High Desert TRACON. Training activities conducted within the R-2508 Complex are widely dispersed over a very large area, and occur over a significant range of flight altitudes. Most of the military operating areas (MOAs) associated with the R-2508 Complex provide for flight altitudes between 200 feet (91 m) AGL and 18,000 feet (5,486 m) msl. Aircraft are required to maintain flight altitudes of at least 3,000 feet (914 m) AGL over Sequoia National Park, Kings

Canyon National Park, the 1977 boundaries of the former Death Valley National Monument, and the 1977 boundary portion of the Domeland Wilderness. Air traffic control assigned airspace (ATCAA) designations above the MOAs provide for flight operations up to 60,000 feet (18,288 m) msl.

Aircraft from NAS Lemoore generally use the northern half of the R-2508 Complex (the Owens, Saline, and Panamint MOAs) more heavily than the southern half of the complex. The northwestern portion of the R-2508 Complex (Owens MOA) overlies significant portions of Kings Canyon National Park, Sequoia National Park, and several wilderness areas. The eastern part of the R-2508 Complex overlies a major portion of Death Valley National Park. The Owens Valley occupies the north-central portion of the R-2508 Complex. The southern half of the R-2508 complex encompasses the southern end of the Sierra Nevada and desert areas northward from Edwards Air Force Base and the segment of I-15 that runs eastward from Barstow.

Aircraft based at NAS Lemoore currently account for about 13 percent of all aircraft flights conducted in or passing through the R-2508 Complex. By the end of Phase 1 of the proposed action, the additional sorties by NAS Lemoore aircraft would increase overall use of the R-2508 complex by 9.2 percent (assuming no concurrent increases in flight operations by aircraft from other military bases, national guard units, private aircraft, or commercial aircraft that fly through the area).

Considering only military aircraft, Phase 1 of the proposed action would increase military aircraft operations in the R-2508 Complex by 19.5 percent (assuming no concurrent increase in operations by aircraft from other military bases or national guard units). On a daily average basis, Phase 1 of the proposed action would increase the number of military aircraft sorties in the R-2508 Complex from 97 sorties per day to 116 sorties per day. Ignoring the complexities of differences in flight profiles and noise generation among different types of military aircraft, a 19.5 percent increase in military aircraft sorties (from 35,276 sorties in 1997 to 42,161 sorties in 2004) would be expected to produce less than a 1 dBA increase in average CNEL levels.

Phase 2 of the proposed action would result in the one-for-one replacement of six F/A-18C/D aircraft squadrons by six F/A-18E/F aircraft squadrons. In addition, the existing F/A-18C/D training squadron would be reduced in size from 36 aircraft to 10 aircraft. The net result of these changes would be a reduction in flights from NAS Lemoore to the R-2058 complex compared to Phase 1 conditions. Military aircraft sorties in the R-2508 complex would drop to 38,129 annual sorties in 2010 (104 sorties per day), as compared to 42,161 sorties in 2004 and 35,276 sorties in 1997.

Phase 2 would reduce noise impacts in the R-2508 Complex compared to Phase 1 conditions. Not only would there be fewer sorties at the end of Phase 2

compared to Phase 1, but most of those sorties would be conducted by the newer F/A-18E/F aircraft, which are less noisy at high power settings than the existing F/A-18C/D aircraft.

Overall average noise conditions are particularly relevant to communities in the Owens Valley and Mojave Desert portions of the R-2508 Complex. Individual overflight events are of more concern to visitors at the various national parks and wilderness areas. Variations in flight conditions result in a wide range of potential noise levels near aircraft flight tracks. The highest noise levels will occur when aircraft fly at high power settings, high air speeds, and low flight altitudes. As noted previously, pilots using the R-2508 Complex are instructed to maintain flight altitudes at least 3,000 feet (914 m) AGL over designated noise-sensitive areas as described above.

A typical flyover event by an F/A-18E/F aircraft flying 3,000 feet (914 m) AGL at 420 knots (778 kph) in a military power setting would produce a peak noise level of about 101 dBA. The peak noise level for F/A-18E/F aircraft under these conditions is about 5 dBA lower than the peak noise level generated by existing F/A-18C/D aircraft at similar flight conditions (see Table F-14). Noise levels would increase rapidly over a 4- or 5-second interval during the approach segment of an overflight event, and then diminish more gradually after the aircraft passes overhead. Aircraft overflights at lower altitudes would generate higher peak noise levels: 104 dBA for overflights at 2,000 feet (609 m) AGL, and 110 dBA for overflights at 1,000 feet (304 m) AGL.

A typical flyover event by an F/A-18E/F aircraft flying 3,000 feet (914 m) AGL at 500 knots (927 kph) using afterburners would produce a peak noise level of about 105 dBA. The peak noise level for F/A-18E/F aircraft under these conditions is about 6 dBA lower than the peak noise level generated by existing F/A-18C/D aircraft at similar flight conditions (see Table F-14). Noise levels would increase very rapidly over a 3-second interval during the approach segment of an overflight event, and then diminish more gradually after the aircraft passes overhead. Aircraft overflights at lower altitudes would generate higher peak noise levels: 108 dBA for overflights at 2,000 feet (609 m) AGL, and 114 dBA for overflights at 1,000 feet (304 m) AGL.

Very rapid increases in noise levels during the approach segment of an overflight event can produce startle reactions for people or animals under the flight path. Such reactions can occur when people or animals are shielded by terrain features from the approach segment of the flight path, resulting in a sudden increase in noise levels when the aircraft appears directly overhead. Startle reactions can also be produced in the absence of terrain shielding when low-flying aircraft travel at speeds that are a significant fraction of the speed of sound. The approach segment of the noise event in such cases is very short, giving little advance warning of the noise peak that occurs as the aircraft passes overhead.

F.5 NOISE IMPACTS ALONG THE VR-1257 CORRIDOR

Aircraft from NAS Lemoore use a number of low altitude military training routes. All but one of these routes avoid significant noise sensitive land uses. The VR-1257 low altitude military training route passes over portions of Joshua Tree National Park and Anza-Borrego Desert State Park.

NAS Lemoore serves as the scheduling authority for use of a low altitude military training route designated as VR-1257. VR-1257 starts at the California coast near the Los Padres National Forest, runs along the eastern side of the coast range, and terminates west of the Salton Sea. VR-1257 is specifically designated for low altitude flight operations, and has a maximum flight altitude of 1,500 feet (457 m) AGL. Typical flight altitudes along this route are 400 feet (122 m) AGL, 1,000 feet (305 m) AGL, or 1,500 feet (457 m) AGL, depending on the land uses being crossed. The portion of the VR-1257 corridor that crosses Joshua Tree National Park is flown at the maximum allowable altitude of 1,500 feet (457 m) AGL. Most flight activity along VR-1257 occurs during daylight hours.

Current use of the VR-1257 corridor is relatively low. There were 164 aircraft sorties flown along the VR-1257 corridor during 1997, with 87 of those sorties being flown by F/A-18C/D aircraft. Phase 1 of the proposed action would add 50 sorties per year by F/A-18E/F aircraft, resulting in 214 annual sorties by the year 2004. This represents about one added aircraft sortie per week (from 3.2 sorties per week to 4.1 sorties per week).

The added F/A-18E/F aircraft sorties along VR-1257 would increase annual average CNEL levels by an undetectable 0.5 dBA. Annual average CNEL noise levels would be 55 dBA for those portions of the route flown at 400 feet above ground level, and less than 50 dBA for those portions of the corridor flown at altitudes of 1,000 or 1,500 feet (305 or 457 m) AGL (Wyle Laboratories 1998).

F/A-18E/F flight events along the VR-1257 corridor would produce brief episodes of high noise levels. A typical flyover event for an F/A-18E/F aircraft flying 400 feet (122 m) AGL at 420 knots (788 kph) and 85 percent power would produce a peak noise level of about 108 dBA. A flyover event by an F/A-18E/F aircraft flying 1,000 feet (305 m) AGL at 420 knots (788 kph) and 85 percent power would produce a peak noise level of about 101 dBA. A typical flyover event for an F/A-18E/F aircraft flying 1,500 feet (457 m) AGL at 420 knots (788 kph) and 85 percent power would produce a peak noise level of about 97 dBA. In all cases, noise levels would increase rapidly over a 4- or 5-second interval during the approach segment of an overflight event, and then diminish more gradually after the aircraft passes overhead.

As noted previously, the F/A-18E/F aircraft is less noisy than the existing F/A-18C/D aircraft when operated at high air speeds and high power settings. The peak noise levels for F/A-18E/F aircraft under flight conditions used along VR-

1257 are about 3 dBA lower than those generated by existing F/A-18C/D aircraft (see Table F-14).

Phase 2 of the proposed action would reduce noise impacts along the VR-1257 corridor slightly as F/A-18E/F aircraft replace existing F/A-18C/D aircraft. In addition, the reduction in the size of the F/A-18C/D training squadron (from 36 aircraft to 10 aircraft) might lead to a minor reduction in the number of F/A-18 aircraft sorties along the VR-1257 corridor.

F.6 References

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TABLE F-1. TYPICAL A-WEIGHTED SOUND LEVELS FOR VARIOUS NOISE SOURCES AND CONDITIONS

dBA	URBAN/SUBURBAN NOISE EXAMPLES	INDOOR NOISE EXAMPLES	EQUIPMENT NOISE EXAMPLES	OTHER NOISE EXAMPLES
120	...	...	...	Air raid siren at 50 feet; Threshold of pain
115	...	...	...	...
110	...	Peak crowd noise, indoor sports arena	...	Peak crowd noise, pro football game, open stadium
105	Emergency vehicle siren at 50 feet	...	Pile driver peak dBA at 50 feet	Chain saw (2-stroke gasoline engine) at 3 feet
100	...	...	...	...
95	Locomotive horn at 100 feet	...	Pile driving operation, average noise at 50 feet	Wood chipper processing tree branches at 30 feet
90	Heavy truck, 35 mph at 20 ft; Leaf blower at 5 ft	Average crowd noise, indoor sports arena	Jackhammer at 50 feet	Person yelling at 5 feet; Dog barking at 5 feet
85	Power lawn mower at 5 feet; City bus at 30 feet	...	Tractor, Bulldozer, Grader, or Paver at 50 feet	Pneumatic wrench at 50 feet
80	2-Axle truck, 35 mph at 20 feet	Vacuum cleaner at 5 ft; Food blender at 3 ft	Fork lift, Front-end loader at 50 feet	Gas well drilling rig at 50 ft; Table saw at 50 ft
75	Street sweeper at 30 feet; Idling locomotive, 50 ft	Commercial airliner passenger cabin	Roller/Compactor at 50 feet	Beach with medium wind and surf
70	Auto/Pickup/Van, 35 mph at 20 feet	Sink faucet, high flow at 3-5 feet	...	Stream bank at small/medium waterfall (10 feet)
65	Typical busy downtown background conditions	...	...	...
60	Typical urban background conditions	Typical busy office	56-ft diameter wind turbine, 72 rpm at 100 feet	Normal speech at 5 feet
55	...	Microwave oven at 5 feet	...	Leaves rustling in light/moderate wind
50	Typical suburban background conditions	...	56-ft diameter wind turbine, 48 rpm at 100 feet	Open field, summer night, insects
45	...	...	...	Typical rural area background conditions
40	Quiet suburban area at night	...	...	...
35	...	...	...	...
30	...	Quiet bedroom at night, no air conditioner	...	Quiet rural area, winter night, no wind
25	...	...	...	...
20	...	Empty recording studio	...	Barren area: no wind, water, insects, or animals
15	...	...	...	...
10	...	Audiometric testing booth	...	...
5	...	...	...	...
0	...	...	...	Hearing threshold, no hearing loss

Note: Indicated noise levels are average dBA levels for stationary noise sources or peak dBA levels for noise sources moving past an indicated reference point. Average and peak dBA levels are not time-weighted 24-hour average CNEL or Ldn levels.

Figure F-1

SPEED OF SOUND IN STILL AIR

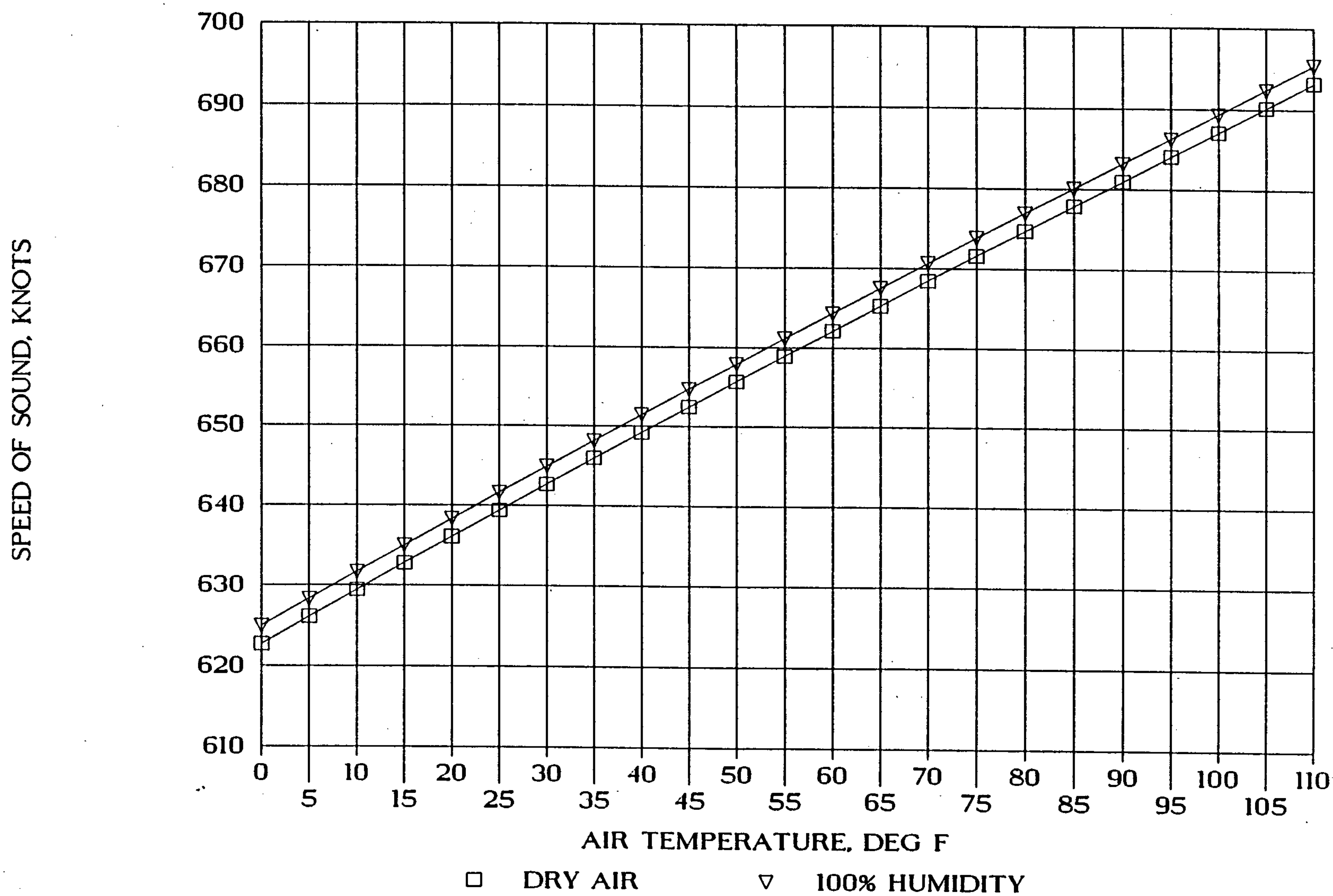


TABLE F-2. FLYOVER EVENT TIME, 4 NM AUDIBLE PATH

AIR SPEED (KNOTS)	AIR SPEED (MPH)	% SPEED OF SOUND	2 NM APPROACH LAG TIME (SEC)	2 NM DEPARTURE TIME (SEC)	4 NM TOTAL TIME (SEC)
100	115	15.1%	61.1	72.0	133.1
125	144	18.9%	46.7	57.6	104.3
140	161	21.1%	40.6	51.4	92.0
150	173	22.6%	37.1	48.0	85.1
175	201	26.4%	30.3	41.1	71.4
200	230	30.2%	25.1	36.0	61.1
225	259	33.9%	21.1	32.0	53.1
250	288	37.7%	17.9	28.8	46.7
270	311	40.7%	15.8	26.7	42.5
300	345	45.3%	13.1	24.0	37.1
325	374	49.0%	11.3	22.2	33.4
350	403	52.8%	9.7	20.6	30.3
360	414	54.3%	9.1	20.0	29.1
375	432	56.6%	8.3	19.2	27.5
400	460	60.3%	7.1	18.0	25.1
420	483	63.4%	6.3	17.1	23.4
450	518	67.9%	5.1	16.0	21.1
475	547	71.7%	4.3	15.2	19.5
500	575	75.4%	3.5	14.4	17.9
525	604	79.2%	2.9	13.7	16.6
550	633	83.0%	2.2	13.1	15.3
575	662	86.7%	1.7	12.5	14.2
600	690	90.5%	1.1	12.0	13.1
625	719	94.3%	0.7	11.5	12.2

Notes: NM = nautical mile (1.15078 statute miles)
Approach lag time is the difference in arrival times for the aircraft versus initial sound, based on the selected audible approach distance and aircraft flight speed.
Departure time is based on the audible departure distance and aircraft flight speed (for subsonic flight) or the speed of sound (for supersonic flight).
The speed of sound is:
663 knots = 763 mph, assuming
60 degrees Fahrenheit
40% relative humidity

TABLE F-3. F/A-18C/D AIRCRAFT NOISE DATA USED FOR FLYOVER EVENT SIMULATIONS

FLIGHT MODE	POWER SETTING (% RPM)	CONFIGURATION	AIR SPEED (KNOTS)	SLANT DISTANCE (FEET)	dBA DATA SEL	dBA DATA Peak dBA	SEL VALUE DATA SOURCE	PEAK dBA DATA SOURCE
MILITARY TAKEOFF	96.5%	NO DRAG	250	1,000	116.90	108.89	NOISEFILE Database	simulation
MILITARY TAKEOFF	100.8%	NO DRAG	250	1,000	122.60	114.72	Power adjustment	simulation
MIN AB TAKEOFF	96.7%	NO DRAG	250	1,000	120.80	112.88	NOISEFILE Database	simulation
	96.7%	NO DRAG	350	1,000	120.80	114.57	simulation	simulation
MAX AB TAKEOFF	100.8%	NO DRAG	250	1,000	126.50	118.84	Power adjustment	simulation
MIN AFTERBURNER	96.7%	CLEAN	350	1,000	119.30	113.04	OMEGA10.8	simulation
	96.7%	CLEAN	420	1,000	119.30	113.93	simulation	simulation
MAX AFTERBURNER	100.8%	CLEAN	350	1,000	125.00	118.86	Power adjustment	simulation
	100.8%	CLEAN	420	1,000	125.00	119.88	simulation	simulation
	100.8%	CLEAN	500	1,000	125.00	120.73	simulation	simulation
MILITARY/IRP	100.8%	CLEAN	300	1,000	121.10	114.08	OMEGA10.8	simulation
	100.8%	CLEAN	420	1,000	121.10	115.90	simulation	simulation
	100.8%	CLEAN	500	1,000	121.10	116.74	simulation	simulation
MILITARY	96.5%	CLEAN	300	1,000	115.40	108.25	Power adjustment	simulation
	96.5%	CLEAN	420	1,000	115.40	109.93	simulation	simulation
MILITARY	92.0%	CLEAN	420	1,000	109.43	103.80	Power adjustment	simulation
CRUISE	88.0%	CLEAN	400	1,000	100.20	93.85	NOISEFILE Database	simulation
	88.0%	CLEAN	300	1,000	100.20	92.34	simulation	simulation
CRUISE	85.0%	CLEAN	300	1,000	95.91	87.76	Power adjustment	simulation
INTERMEDIATE	84.5%	CLEAN	300	1,000	95.20	87.01	NOISEFILE Database	simulation
HOLDING PATTERN	82.0%	CLEAN	250	1,000	93.30	84.09	NOISEFILE Database	simulation
HOLDING PATTERN	79.7%	CLEAN	200	1,000	89.30	78.78	OMEGA10.8	simulation
APPROACH	88.5%	GEAR & FLAPS	150	1,000	109.80	98.89	NOISEFILE Database	simulation
APPROACH	86.0%	GEAR & FLAPS	150	1,000	104.30	93.08	OMEGA10.8	simulation

TABLE F-4. F/A-18E/F AIRCRAFT NOISE DATA USED FOR FLYOVER EVENT SIMULATIONS

FLIGHT MODE	POWER SETTING (% RPM)	CONFIGURATION	AIR SPEED (KNOTS)	SLANT DISTANCE (FEET)	dBA DATA SEL	dBA DATA Peak dBA	SEL VALUE DATA SOURCE	PEAK dBA DATA SOURCE
MILITARY TAKEOFF	96.0%	NO DRAG	150	1,000	119.20	108.58	OMEGA10.8	simulation
	96.0%	NO DRAG	250	1,000	116.90	108.89	OMEGA10.8	simulation
	96.0%	NO DRAG	250	1,000	119.20	111.25	simulation	simulation
AB TAKEOFF	97.0%	NO DRAG	150	1,000	123.10	112.84	OMEGA10.8	simulation
	97.0%	NO DRAG	250	1,000	120.90	112.98	OMEGA10.8	simulation
	97.0%	NO DRAG	250	1,000	123.10	115.23	simulation	simulation
	97.0%	NO DRAG	350	1,000	123.10	116.92	simulation	simulation
AFTERBURNER	97.0%	CLEAN	420	1,000	118.60	113.22	NOISEFILE Database	simulation
	97.0%	CLEAN	500	1,000	117.80	113.36	OMEGA10.8	simulation
	97.0%	CLEAN	350	1,000	118.60	112.32	simulation	simulation
	97.0%	CLEAN	500	1,000	118.60	114.18	simulation	simulation
MILITARY	96.0%	CLEAN	325	1,000	115.80	109.13	NOISEFILE Database	simulation
	96.0%	CLEAN	420	1,000	114.70	109.22	OMEGA10.8	simulation
	96.0%	CLEAN	300	1,000	115.80	108.66	simulation	simulation
	96.0%	CLEAN	420	1,000	115.80	110.34	simulation	simulation
	96.0%	CLEAN	500	1,000	115.80	111.31	simulation	simulation
MILITARY	85.0%	CLEAN	420	1,000	106.41	100.69	Power adjustment	simulation
CRUISE	83.0%	CLEAN	300	1,000	104.70	97.01	OMEGA10.8	simulation
	83.0%	CLEAN	360	1,000	103.90	97.26	NOISEFILE Database	simulation
	83.0%	CLEAN	420	1,000	103.20	97.27	OMEGA10.8	simulation
	83.0%	CLEAN	400	1,000	104.70	98.50	simulation	simulation
	83.0%	CLEAN	420	1,000	104.70	98.82	simulation	simulation
HOLDING PATTERN	80.0%	CLEAN	270	1,000	98.20	89.76	NOISEFILE Database	simulation
	80.0%	CLEAN	250	1,000	98.20	89.32	simulation	simulation
	80.0%	CLEAN	200	1,000	98.20	88.22	simulation	simulation
APPROACH	84.0%	GEAR & FLAPS	140	1,000	111.60	100.40	NOISEFILE Database	simulation
	84.0%	GEAR & FLAPS	250	1,000	109.10	100.75	OMEGA10.8	simulation
	84.0%	GEAR & FLAPS	150	1,000	111.60	100.75	simulation	simulation
	84.0%	GEAR & FLAPS	250	1,000	111.60	103.33	simulation	simulation

TABLE F-5. COMPARISON OF F/A-18C/D AND F/A-18E/F AIRCRAFT NOISE LEVELS

FLIGHT MODE	AIRCRAFT	POWER SETTING (% RPM)	CONFIGURATION	AIR SPEED (KNOTS)	SLANT DISTANCE (FEET)	dBA ESTIMATES SEL	Peak dBA
MAX AB TAKEOFF	F/A-18C/D	100.8%	NO DRAG	250	1,000	126.50	118.84
	F/A-18E/F	97.0%	NO DRAG	250	1,000	123.10	115.23
CRUISE	F/A-18C/D	85.0%	CLEAN	300	1,000	95.91	87.76
	F/A-18E/F	83.0%	CLEAN	300	1,000	104.70	97.01
MILITARY	F/A-18C/D	92.0%	CLEAN	420	1,000	109.43	103.80
	F/A-18E/F	85.0%	CLEAN	420	1,000	106.41	100.69
MILITARY/IRP	F/A-18C/D	100.8%	CLEAN	420	1,000	121.10	115.90
	F/A-18E/F	96.0%	CLEAN	420	1,000	115.80	110.34
AFTERBURNER	F/A-18C/D	100.8%	CLEAN	420	1,000	125.00	119.88
	F/A-18E/F	97.0%	CLEAN	420	1,000	118.60	113.22
AFTERBURNER	F/A-18C/D	100.8%	CLEAN	500	1,000	125.00	120.73
	F/A-18E/F	97.0%	CLEAN	500	1,000	118.60	114.18
HOLDING PATTERN	F/A-18C/D	82.0%	CLEAN	250	1,000	93.30	84.09
	F/A-18E/F	80.0%	CLEAN	250	1,000	98.20	89.32
APPROACH	F/A-18C/D	88.5%	GEAR & FLAPS	150	1,000	109.80	98.89
	F/A-18E/F	84.0%	GEAR & FLAPS	150	1,000	111.60	100.75

TABLE F-6. F/A-18C/D SIMULATION: CRUISE POWER, 300 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	87.76 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	37.20 seconds (4 NM)	345	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	300	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
40.73	11818	2	0.73	1	1.5
42.88	19410	3	2.15	2	3.0
46.40	43638	4	3.52	3	4.5
51.17	131030	5	4.78	4	6.0
57.06	508214	6	5.89	5	7.4
63.88	2443431	7	6.82	6	8.9
71.43	13883910	8	7.55	7	10.4
79.47	88441541	9	8.04	8	11.9
87.76	597035287	10	8.29	9	13.4
87.76	597035287	11	0.00	10	14.9
86.48	444281908	12	-1.28	11	16.4
85.11	324227048	13	-1.37	12	17.9
83.64	231406183	14	-1.46	13	19.3
82.07	160977700	15	-1.58	14	20.8
80.36	108689662	16	-1.71	15	22.3
78.50	70846036	17	-1.86	16	23.8
76.46	44272301	18	-2.04	17	25.3
74.20	26280400	19	-2.27	18	26.8
71.65	14632934	20	-2.54	19	28.3
68.75	7506518	21	-2.90	20	29.8
65.38	3454167	22	-3.37	21	31.2
61.36	1366554	23	-4.03	22	32.7
56.35	431927	24	-5.00	23	34.2
49.75	94379	25	-6.61	24	35.7
40.00	10000	26	-9.75	25	37.2

SEL(event) =	95.93	dBA
Leq(event) =	80.22	dBA
L(max) =	87.76	dBA
PEAK - SEL =	-8.17	dBA
PEAK - Leq =	7.54	dBA
SEL - Leq =	15.71	dBA

POWER: 85.0% CORE RPM
CONFIGURATION: CLEAN

NOISE RISE: REVERSED SINE CURVE
NOISE DECAY: DECLINING LOG CURVE

SEL delta10 = 95.91 dBA
13.39 seconds

Maximum Noise Level Rise Rate: 5.57 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 60.41 dBA

Figure F-2

F/A-18C/D AIRCRAFT FLYOVER NOISE EVENT

CRUISE (85%), 300 KNOTS AT 1,000 FEET

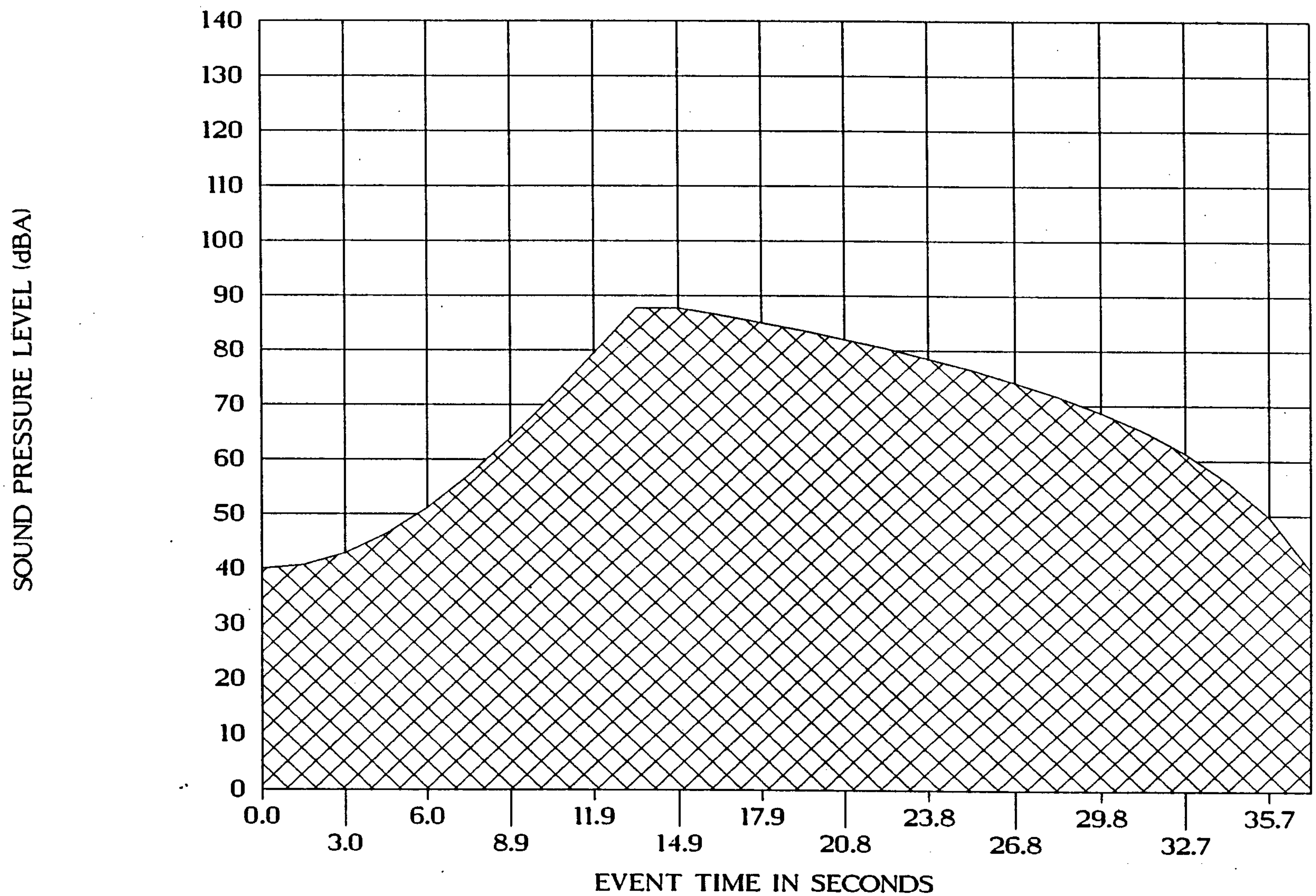


TABLE F-7. F/A-18E/F SIMULATION: CRUISE POWER, 300 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	97.01 dBA		1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	37.20 seconds (4 NM)		345	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA		300	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
40.87	12207	2	0.87	1	1.5
43.44	22071	3	2.57	2	3.0
47.64	58048	4	4.20	3	4.5
53.34	215665	5	5.70	4	6.0
60.36	1087597	6	7.03	5	7.4
68.51	7087613	7	8.14	6	8.9
77.51	56382349	8	9.01	7	10.4
87.11	514081220	9	9.60	8	11.9
97.01	5023425895	10	9.90	9	13.4
97.01	5023425895	11	0.00	10	14.9
95.48	3530220994	12	-1.53	11	16.4
93.84	2423794044	13	-1.63	12	17.9
92.10	1620513944	14	-1.75	13	19.3
90.22	1050795706	15	-1.88	14	20.8
88.18	657512368	16	-2.04	15	22.3
85.96	394486397	17	-2.22	16	23.8
83.52	225062424	18	-2.44	17	25.3
80.82	120763325	19	-2.70	18	26.8
77.78	60031943	20	-3.04	19	28.3
74.32	27061011	21	-3.46	20	29.8
70.30	10714238	22	-4.02	21	31.2
65.49	3541995	23	-4.81	22	32.7
59.52	895678	24	-5.97	23	34.2
51.64	145777	25	-7.88	24	35.7
40.00	10000	26	-11.64	25	37.2

SEL(event) =	104.73	dBA		
Leq(event) =	89.02	dBA	POWER:	83.0% CORE RPM
L(max) =	97.01	dBA	CONFIGURATION:	CLEAN
PEAK - SEL =	-7.72	dBA		
PEAK - Leq =	7.99	dBA	NOISE RISE:	REVERSED SINE CURVE
SEL - Leq =	15.71	dBA	NOISE DECAY:	DECLINING LOG CURVE

SEL delta10 = 104.70 dBA
11.90 seconds

Maximum Noise Level Rise Rate: 6.65 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 69.17 dBA

Figure F-3

F/A-18E/F AIRCRAFT FLYOVER NOISE EVENT

CRUISE POWER, 300 KNOTS AT 1,000 FEET

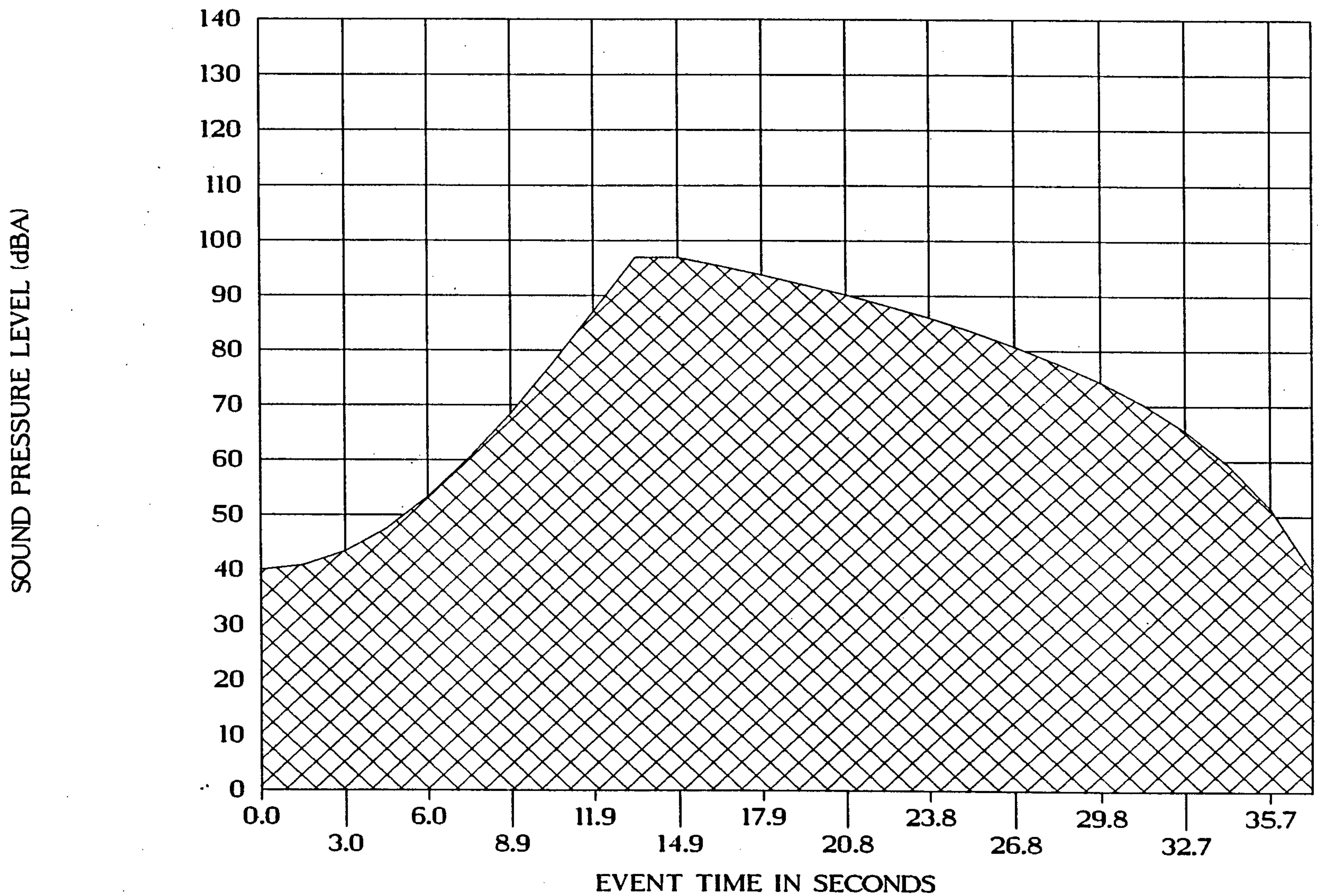


TABLE F-8. F/A-18C/D SIMULATION: MILITARY (92% RPM), 420 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	103.80 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	23.50 seconds (4 NM)	483	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	420	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
41.60	14453	2	1.60	1	0.9
46.32	42837	3	4.72	2	1.9
53.92	246556	4	7.60	3	2.8
64.02	2524266	5	10.10	4	3.8
76.12	40909271	6	12.10	5	4.7
89.60	912675603	7	13.48	6	5.6
103.80	23988329190	8	14.20	7	6.6
103.80	23988329190	9	0.00	8	7.5
102.29	16954499377	10	-1.51	9	8.5
100.70	11746215727	11	-1.59	10	9.4
99.01	7957557778	12	-1.69	11	10.3
97.21	5256110600	13	-1.80	12	11.3
95.28	3373042122	14	-1.93	13	12.2
93.21	2094005668	15	-2.07	14	13.2
90.97	1250847553	16	-2.24	15	14.1
88.54	714098703	17	-2.43	16	15.0
85.87	386228328	18	-2.67	17	16.0
82.91	195636551	19	-2.95	18	16.9
79.61	91361695	20	-3.31	19	17.9
75.85	38476438	21	-3.76	20	18.8
71.51	14145423	22	-4.35	21	19.7
66.35	4314833	23	-5.16	22	20.7
60.01	1002051	24	-6.34	23	21.6
51.77	150406	25	-8.24	24	22.6
40.00	10000	26	-11.77	25	23.5

SEL(event) =	109.52	dBA
Leq(event) =	95.81	dBA
L(max) =	103.80	dBA
PEAK - SEL =	-5.72	dBA
PEAK - Leq =	7.99	dBA
SEL - Leq =	13.71	dBA

POWER: 92.0% CORE RPM
CONFIGURATION: CLEAN

NOISE RISE: REVERSED SINE CURVE
NOISE DECAY: DECLINING LOG CURVE

SEL delta10 = 109.43 dBA
6.58 seconds

Maximum Noise Level Rise Rate: 15.10 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 73.96 dBA

Figure F-4

F/A-18C/D AIRCRAFT FLYOVER NOISE EVENT

MILITARY (92%), 420 KNOTS, 1,000 FEET

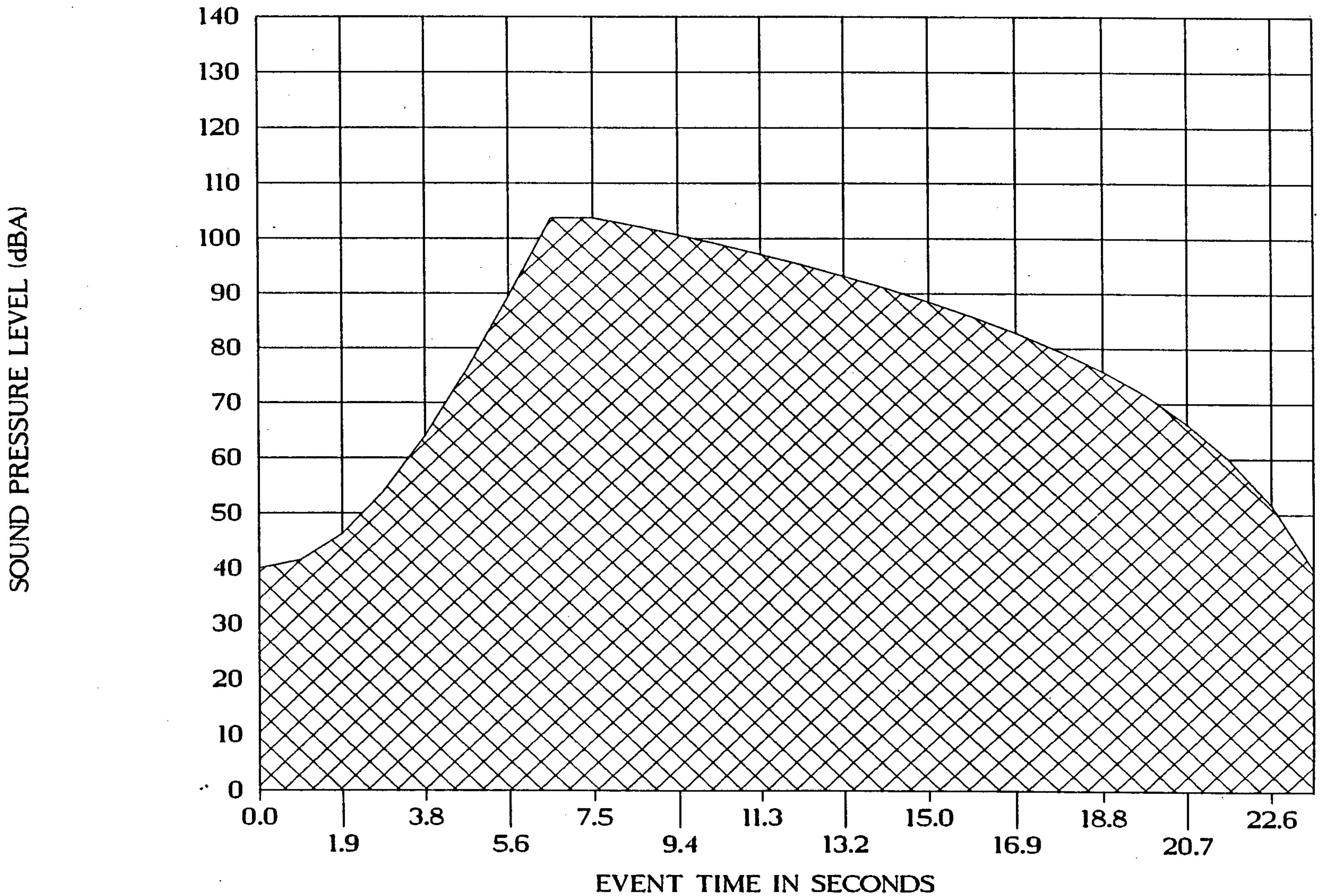


TABLE F-9. F/A-18E/F SIMULATION: MILITARY (85% RPM), 420 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	100.69 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	23.50 seconds (4 NM)	483	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	420	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
41.52	14196	2	1.52	1	0.9
46.01	39904	3	4.49	2	1.9
53.24	210894	4	7.23	3	2.8
62.85	1927704	5	9.61	4	3.8
74.36	27274675	6	11.51	5	4.7
87.19	523022596	7	12.83	6	5.6
100.69	11721953655	8	13.50	7	6.6
100.69	11721953655	9	0.00	8	7.5
99.26	8426199509	10	-1.43	9	8.5
97.74	5943116333	11	-1.52	10	9.4
96.13	4103362711	12	-1.61	11	10.3
94.42	2765696483	13	-1.71	12	11.3
92.59	1813645343	14	-1.83	13	12.2
90.62	1152394118	15	-1.97	14	13.2
88.49	705887746	16	-2.13	15	14.1
86.17	414148936	17	-2.32	16	15.0
83.63	230809376	18	-2.54	17	16.0
80.82	120853332	19	-2.81	18	16.9
77.68	58572318	20	-3.15	19	17.9
74.10	25729459	21	-3.57	20	18.8
69.97	9931978	22	-4.13	21	19.7
65.07	3210109	23	-4.91	22	20.7
59.03	800487	24	-6.03	23	21.6
51.20	131789	25	-7.83	24	22.6
40.00	10000	26	-11.20	25	23.5

SEL(event) =	106.53	dBA		
Leq(event) =	92.82	dBA	POWER:	85.0% CORE RPM
L(max) =	100.69	dBA	CONFIGURATION:	CLEAN
PEAK - SEL =	-5.84	dBA		
PEAK - Leq =	7.87	dBA	NOISE RISE:	REVERSED SINE CURVE
SEL - Leq =	13.71	dBA	NOISE DECAY:	DECLINING LOG CURVE

SEL delta10 = 106.41 dBA
6.58 seconds

Maximum Noise Level Rise Rate: 14.37 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 70.97 dBA

Figure F-5

F/A-18E/F AIRCRAFT FLYOVER NOISE EVENT

MILITARY (85%), 420 KNOTS AT 1,000 FEET

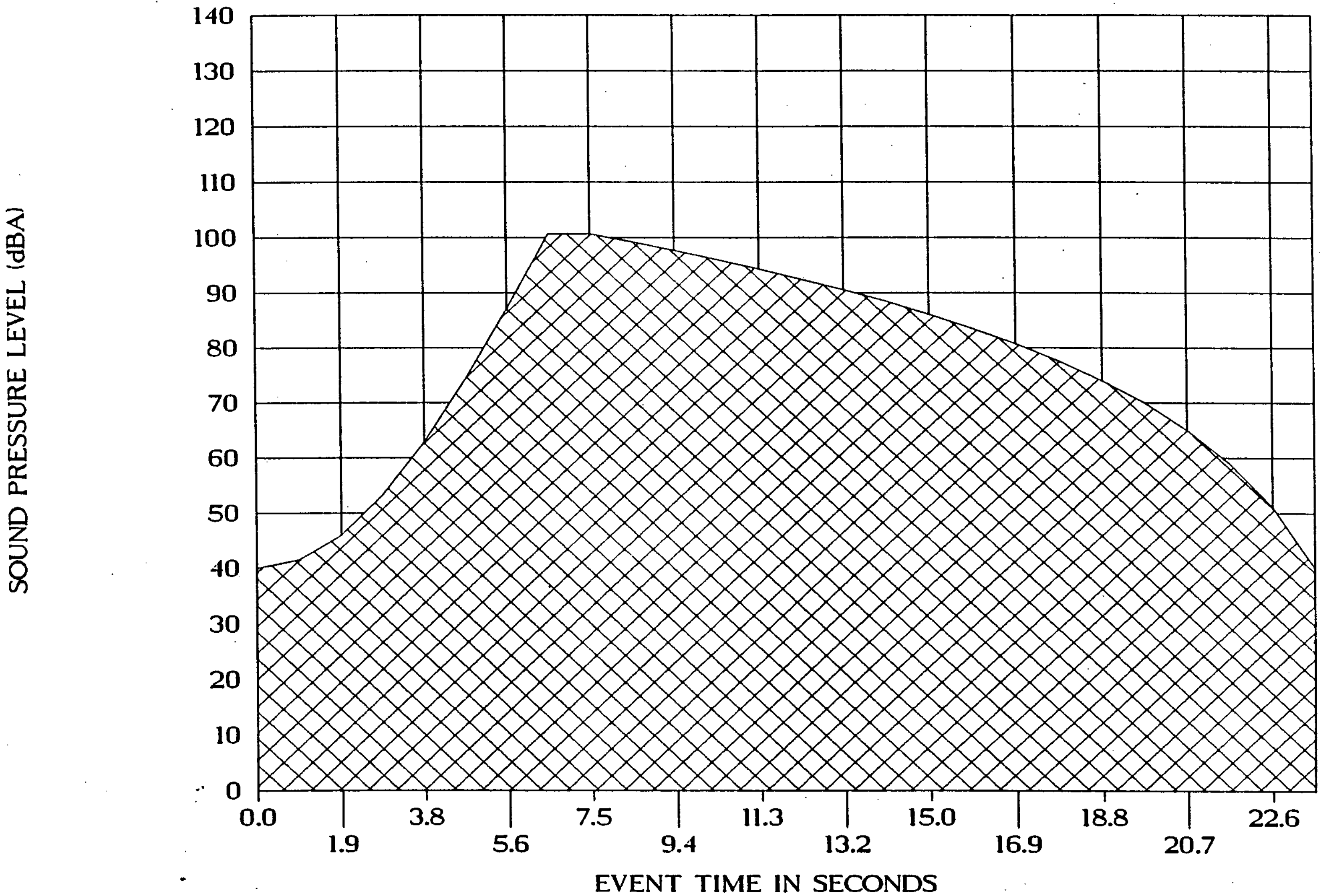


TABLE F-10. F/A-18C/D SIMULATION: MILITARY/IRP POWER, 420 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	115.90 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	23.50 seconds (4 NM)	483	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	420	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
41.90	15499	2	1.90	1	0.9
47.52	56448	3	5.61	2	1.9
56.56	452792	4	9.04	3	2.8
68.58	7206301	5	12.02	4	3.8
82.97	198071696	6	14.39	5	4.7
99.01	7962805565	7	16.04	6	5.6
115.90	389045144994	8	16.89	7	6.6
115.90	389045144994	9	0.00	8	7.5
114.11	257454854879	10	-1.79	9	8.5
112.21	166374023407	11	-1.90	10	9.4
110.20	104687110071	12	-2.01	11	10.3
108.06	63917253660	13	-2.14	12	11.3
105.76	37708537201	14	-2.29	13	12.2
103.30	21385963682	15	-2.46	14	13.2
100.64	11585520750	16	-2.66	15	14.1
97.74	5947009075	17	-2.90	16	15.0
94.57	2862614305	18	-3.18	17	16.0
91.05	1274517163	19	-3.51	18	16.9
87.12	515161683	20	-3.93	19	17.9
82.65	184138928	21	-4.47	20	18.8
77.48	55994650	22	-5.17	21	19.7
71.35	13636361	23	-6.13	22	20.7
63.80	2400873	24	-7.54	23	21.6
54.01	251501	25	-9.80	24	22.6
40.00	10000	26	-14.01	25	23.5

SEL(event) = 121.21 dBA
Leq(event) = 107.49 dBA
L(max) = 115.90 dBA
PEAK - SEL = -5.31 dBA
PEAK - Leq = 8.41 dBA
SEL - Leq = 13.71 dBA

POWER: 100.8% CORE RPM
CONFIGURATION: CLEAN

NOISE RISE: REVERSED SINE CURVE
NOISE DECAY: DECLINING LOG CURVE

SEL delta10 = 121.10 dBA
5.64 seconds

Maximum Noise Level Rise Rate: 17.97 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 85.64 dBA

Figure F-6

F/A-18C/D AIRCRAFT FLYOVER NOISE EVENT

MILITARY POWER, 420 KNOTS AT 1,000 FEET

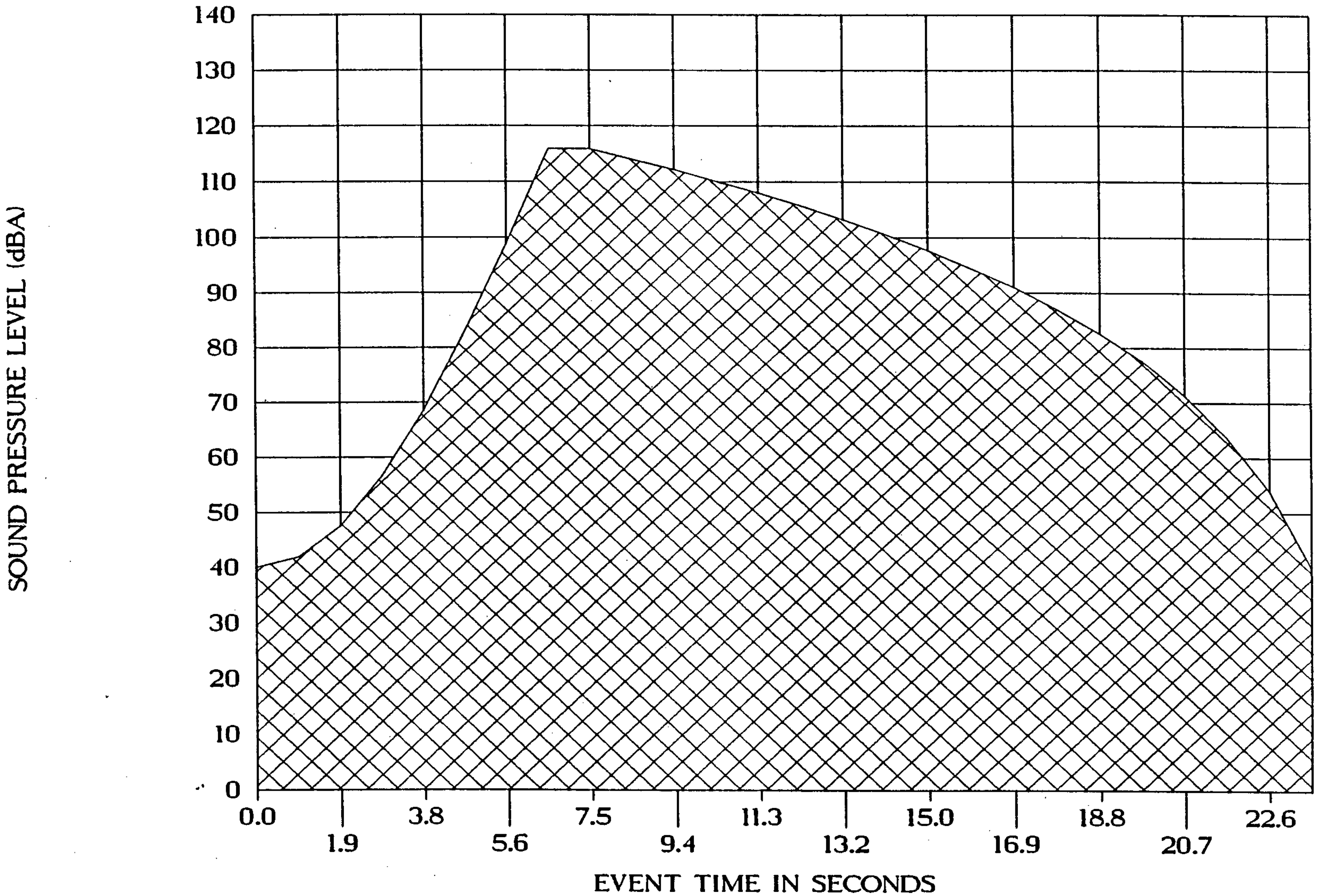


TABLE F-11. F/A-18E/F SIMULATION: MILITARY/IRP POWER, 420 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	110.34 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	23.50 seconds (4 NM)	483	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	420	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
41.76	15009	2	1.76	1	0.9
46.97	49726	3	5.20	2	1.9
55.35	342450	4	8.38	3	2.8
66.48	4450130	5	11.14	4	3.8
79.82	95953712	6	13.34	5	4.7
94.69	2942982981	7	14.87	6	5.6
110.34	108143395130	8	15.65	7	6.6
110.34	108143395130	9	0.00	8	7.5
108.68	73762478156	10	-1.66	9	8.5
106.92	49216427329	11	-1.76	10	9.4
105.06	32037304908	12	-1.86	11	10.3
103.07	20280443063	13	-1.99	12	11.3
100.95	12436189140	14	-2.12	13	12.2
98.66	7352241827	15	-2.28	14	13.2
96.20	4165889818	16	-2.47	15	14.1
93.51	2245466103	17	-2.68	16	15.0
90.57	1140332741	18	-2.94	17	16.0
87.31	538712751	19	-3.26	18	16.9
83.67	232687746	20	-3.65	19	17.9
79.53	89682030	21	-4.14	20	18.8
74.74	29756288	22	-4.79	21	19.7
69.05	8036527	23	-5.69	22	20.7
62.06	1606930	24	-6.99	23	21.6
52.98	198584	25	-9.08	24	22.6
40.00	10000	26	-12.98	25	23.5

SEL(event) =	115.82	dBA		
Leq(event) =	102.11	dBA	POWER:	96.0% CORE RPM
L(max) =	110.34	dBA	CONFIGURATION:	CLEAN
PEAK - SEL =	-5.48	dBA		
PEAK - Leq =	8.23	dBA	NOISE RISE:	REVERSED SINE CURVE
SEL - Leq =	13.71	dBA	NOISE DECAY:	DECLINING LOG CURVE

SEL delta10 = 115.80 dBA
6.58 seconds

Maximum Noise Level Rise Rate: 16.65 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 80.26 dBA

Figure F-7

F/A-18E/F AIRCRAFT FLYOVER NOISE EVENT

MILITARY POWER, 420 KNOTS AT 1,000 FEET

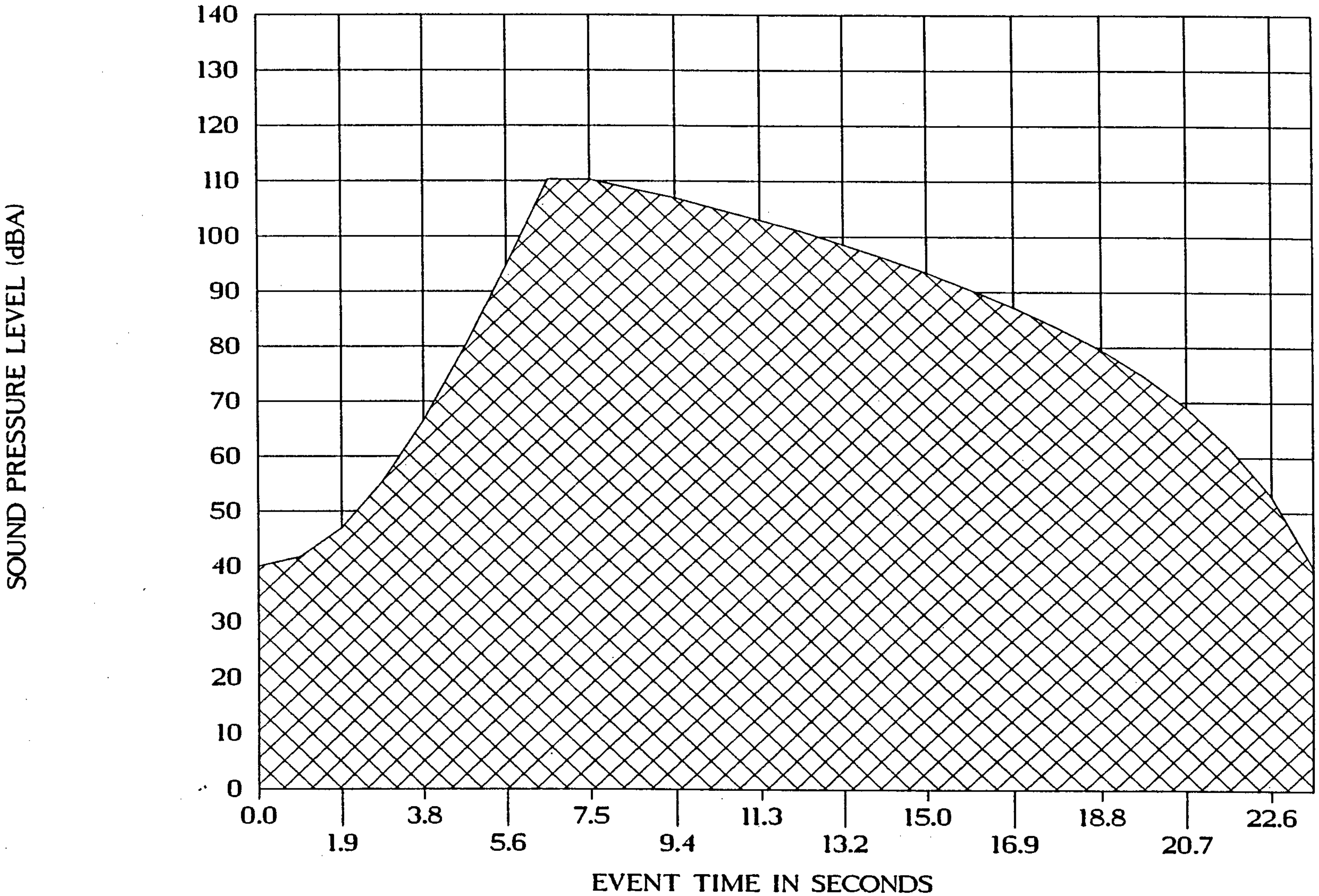


TABLE F-12. F/A-18C/D SIMULATION: MAXIMUM AFTERBURNER, 500 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	120.73 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	18.00 seconds (4 NM)	575	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	500	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
43.95	24838	2	3.95	1	0.7
55.42	348182	3	11.47	2	1.4
73.28	21272065	4	17.86	3	2.2
95.78	3787091554	5	22.50	4	2.9
120.73	1183041555725	6	24.95	5	3.6
120.73	1183041555725	7	0.00	6	4.3
119.03	799578880446	8	-1.70	7	5.0
117.24	529716293284	9	-1.79	8	5.8
115.36	343251710311	10	-1.88	9	6.5
113.36	217008606817	11	-1.99	10	7.2
111.25	133458445374	12	-2.11	11	7.9
109.01	79557620776	13	-2.25	12	8.6
106.61	45775133418	14	-2.40	13	9.4
104.03	25288648762	15	-2.58	14	10.1
101.25	13328040304	16	-2.78	15	10.8
98.23	6646946443	17	-3.02	16	11.5
94.92	3104297533	18	-3.31	17	12.2
91.27	1339187570	19	-3.65	18	13.0
87.19	523874946	20	-4.08	19	13.7
82.58	181097773	21	-4.61	20	14.4
77.27	53280731	22	-5.31	21	15.1
71.00	12591172	23	-6.27	22	15.8
63.37	2171274	24	-7.63	23	16.6
53.60	228838	25	-9.77	24	17.3
40.00	10000	26	-13.60	25	18.0

SEL(event) =	125.00	dBA		
Leq(event) =	112.45	dBA	POWER:	100.8% CORE RPM
L(max) =	120.73	dBA	CONFIGURATION:	CLEAN
PEAK - SEL =	-4.27	dBA		
PEAK - Leq =	8.28	dBA	NOISE RISE:	REVERSED SINE CURVE
SEL - Leq =	12.55	dBA	NOISE DECAY:	DECLINING LOG CURVE

SEL delta10 = 125.00 dBA
5.04 seconds

Maximum Noise Level Rise Rate: 34.65 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 89.44 dBA

Figure F-8

F/A-18C/D AIRCRAFT FLYOVER NOISE EVENT

MAX AFTERBURNER, 500 KNOTS, 1,000 FEET

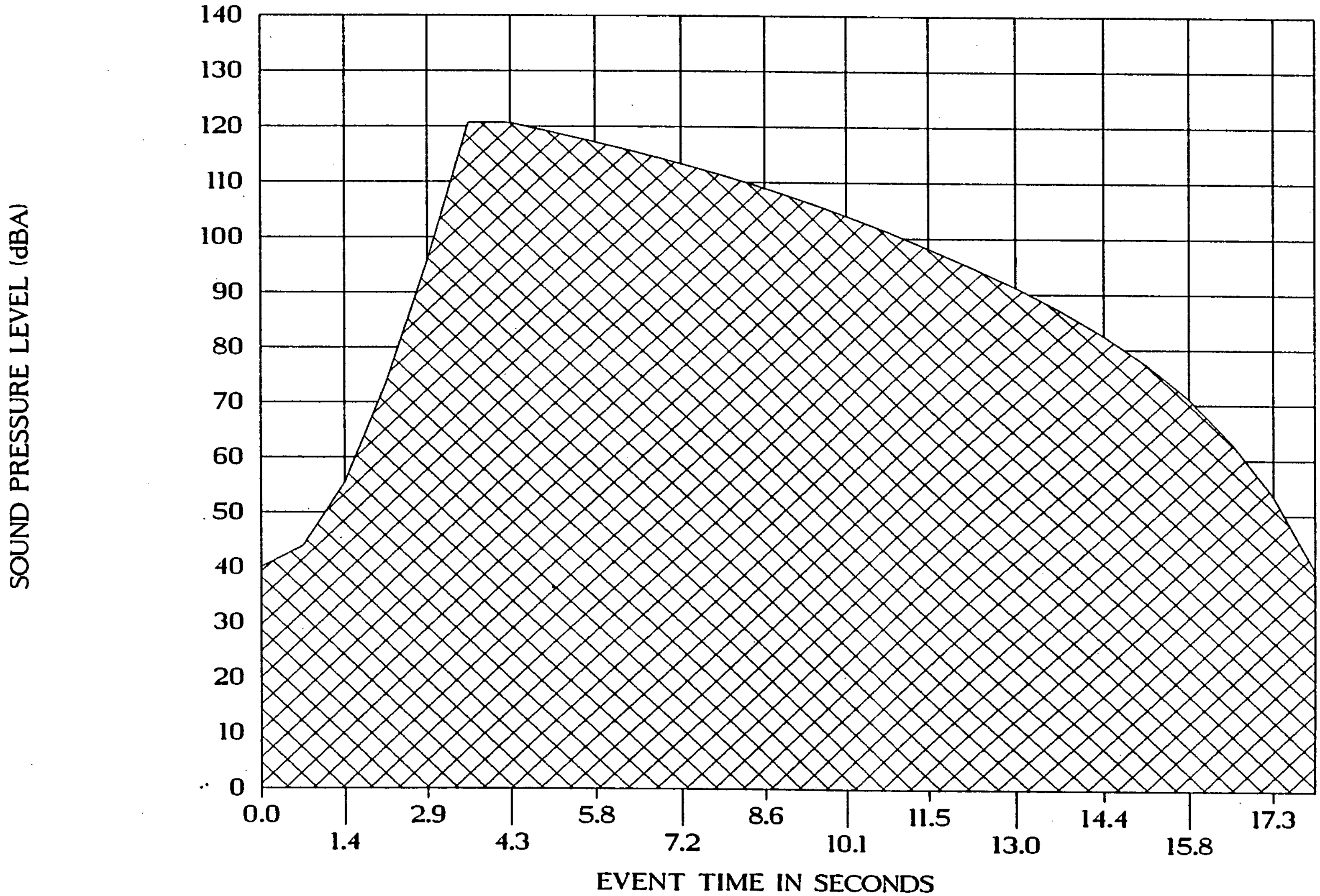


TABLE F-13. F/A-18E/F SIMULATION: AFTERBURNER POWER, 500 KNOTS AT 1,000 FT

INPUT==>	PEAK dB =	114.18 dBA	1,000	FT SLANT DIST.
INPUT==>	EVENT DURATION =	18.00 seconds (4 NM)	575	MPH
INPUT==>	BACKGROUND dB =	40.00 dBA	500	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
40.00	10000	1	0.00	0	0.0
43.63	23071	2	3.63	1	0.7
54.17	261043	3	10.54	2	1.4
70.58	11423758	4	16.41	3	2.2
91.26	1335709257	5	20.68	4	2.9
114.18	261818300822	6	22.92	5	3.6
114.18	261818300822	7	0.00	6	4.3
112.62	182669254564	8	-1.56	7	5.0
110.97	125128375785	9	-1.64	8	5.8
109.24	83987264744	10	-1.73	9	6.5
107.41	55110518278	11	-1.83	10	7.2
105.47	35256047994	12	-1.94	11	7.9
103.41	21917822748	13	-2.06	12	8.6
101.20	13189301320	14	-2.21	13	9.4
98.83	7645863112	15	-2.37	14	10.1
96.28	4244588077	16	-2.56	15	10.8
93.50	2239782196	17	-2.78	16	11.5
90.46	1112691669	18	-3.04	17	12.2
87.11	513898021	19	-3.35	18	13.0
83.36	216937567	20	-3.75	19	13.7
79.12	81742673	21	-4.24	20	14.4
74.24	26559275	22	-4.88	21	15.1
68.49	7055753	23	-5.76	22	15.8
61.47	1403221	24	-7.01	23	16.6
52.49	177511	25	-8.98	24	17.3
40.00	10000	26	-12.49	25	18.0

SEL(event) =	118.65	dBA		
Leq(event) =	106.10	dBA	POWER:	97.0% CORE RPM
L(max) =	114.18	dBA	CONFIGURATION:	CLEAN
PEAK - SEL =	-4.47	dBA		
PEAK - Leq =	8.08	dBA	NOISE RISE:	REVERSED SINE CURVE
SEL - Leq =	12.55	dBA	NOISE DECAY:	DECLINING LOG CURVE

SEL delta10 = 118.60 dBA
5.04 seconds

Maximum Noise Level Rise Rate: 31.84 dBA/second

Event Rate = 1.0 per hour
Leq(1 hr) = 83.09 dBA

Figure F-9

F/A-18E/F AIRCRAFT FLYOVER NOISE EVENT

AFTERBURNER, 500 KNOTS AT 1,000 FEET

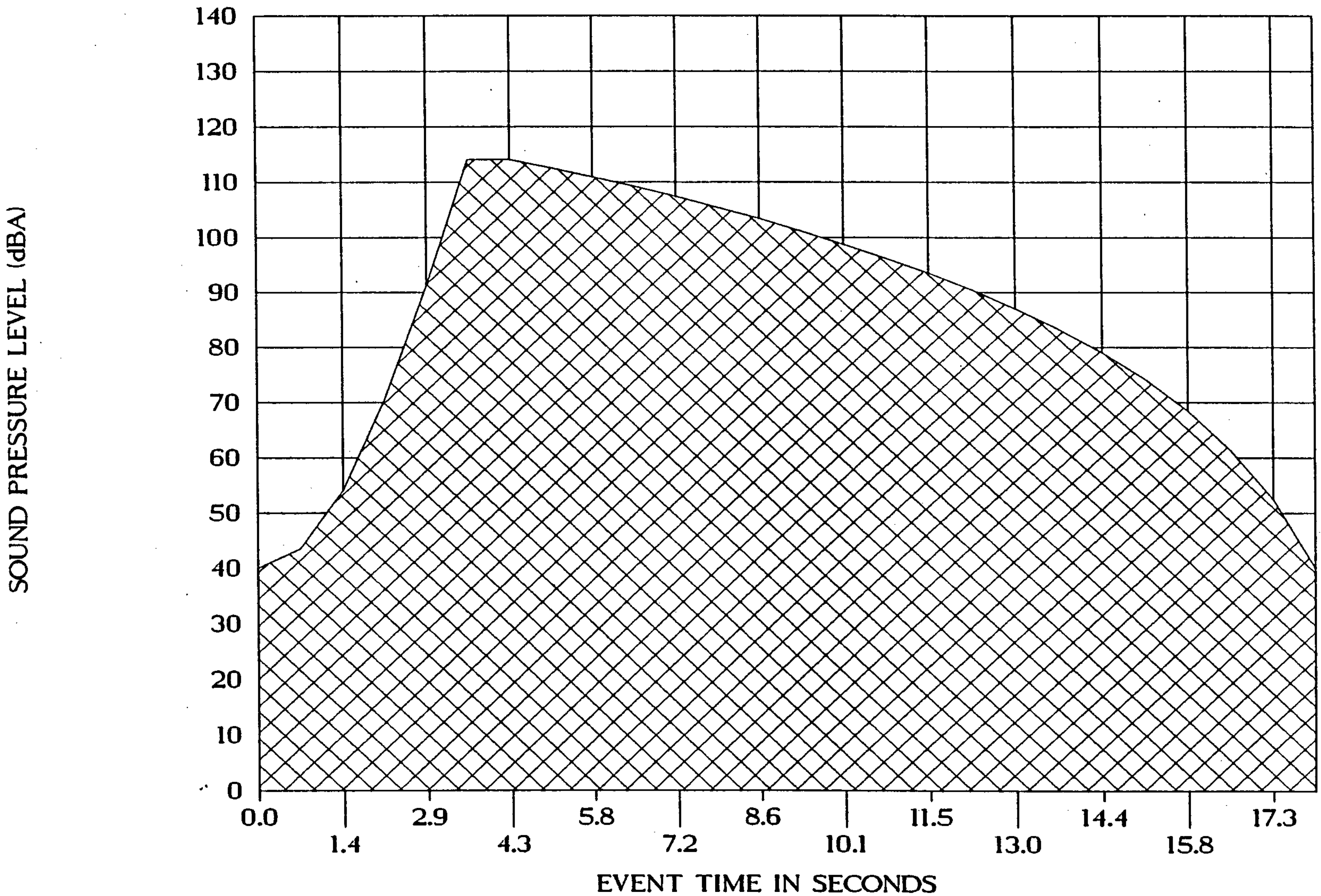


Figure F-10

F/A-18C/D SEL DROP-OFF CALIBRATION

APPROACH POWER, 5.3 dB & 0.224 dB/100 M

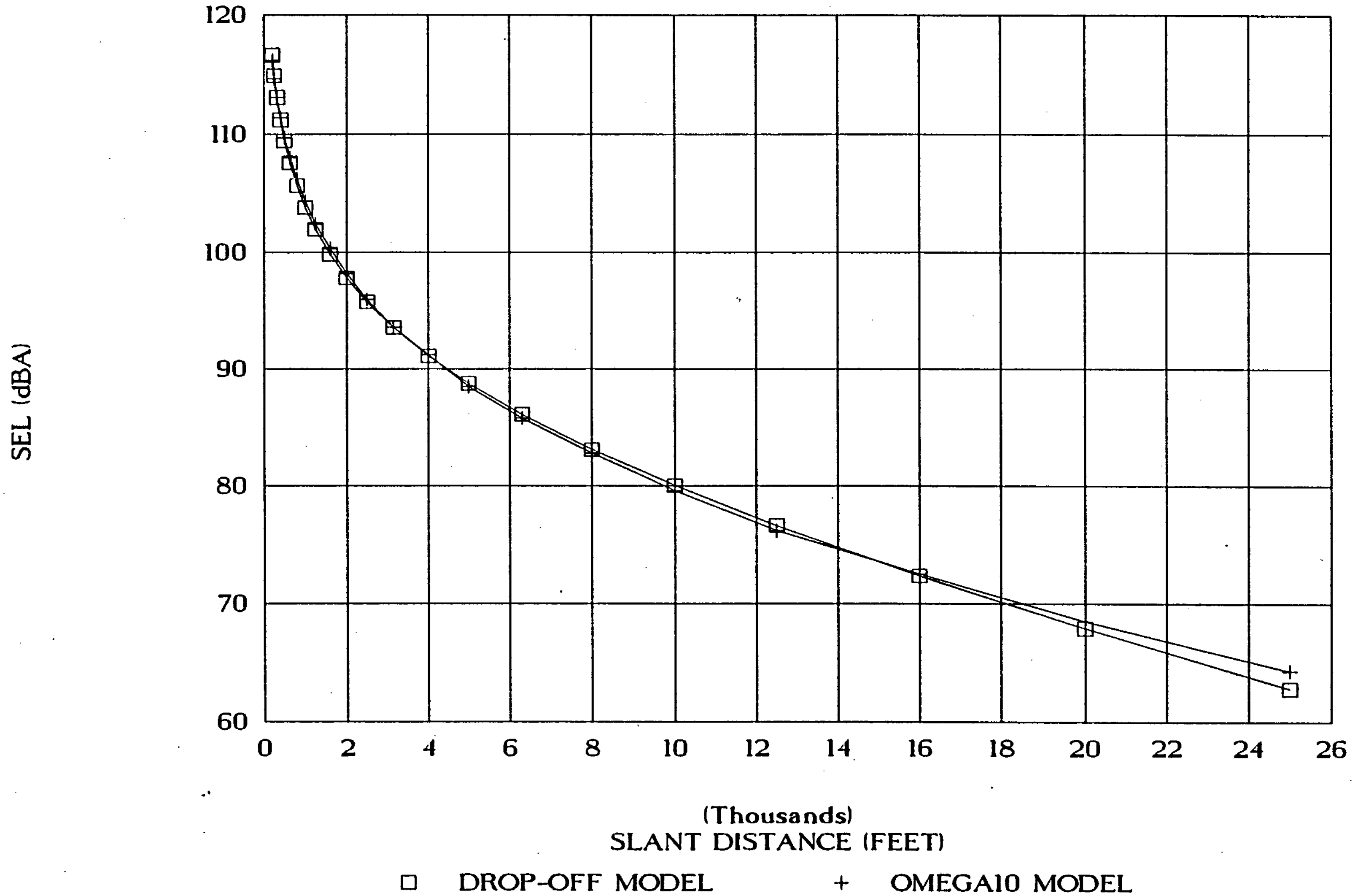


Figure F-11

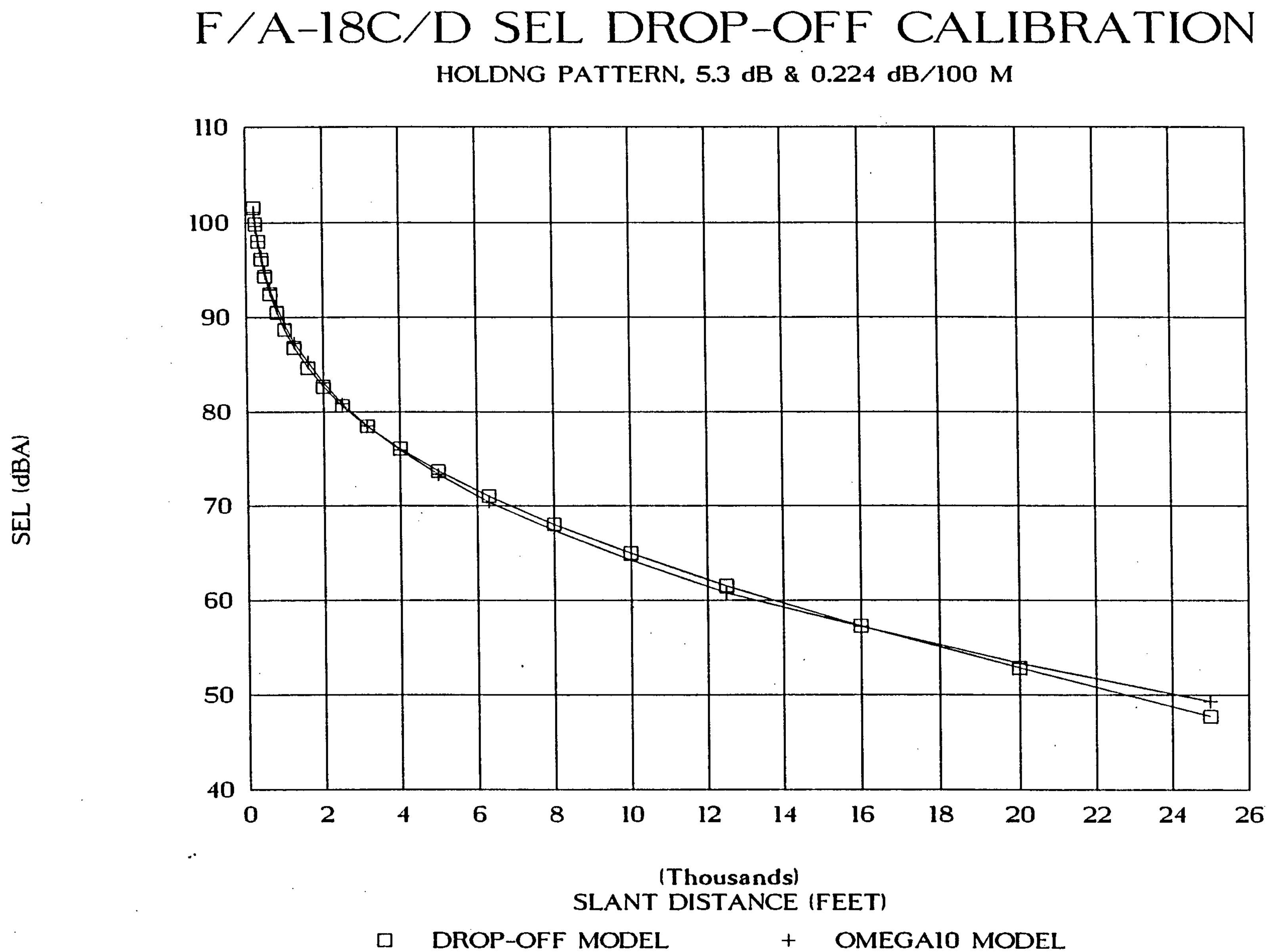

F/A-18C/D SEL DROP-OFF CALIBRATION
HOLDNG PATTERN, 5.3 dB & 0.224 dB/100 M
SEL (dBA)
110
100
90
80
70
60
50
40
0
2
4
6
8
10
12
14
16
18
20
22
24
26
(Thousands)
SLANT DISTANCE (FEET)
DROP-OFF MODEL
OMEGA10 MODEL

Figure F-12

F/A-18C/D SEL DROP-OFF CALIBRATION

IRP POWER, 5.95 dB & 0.191 dB/100 M

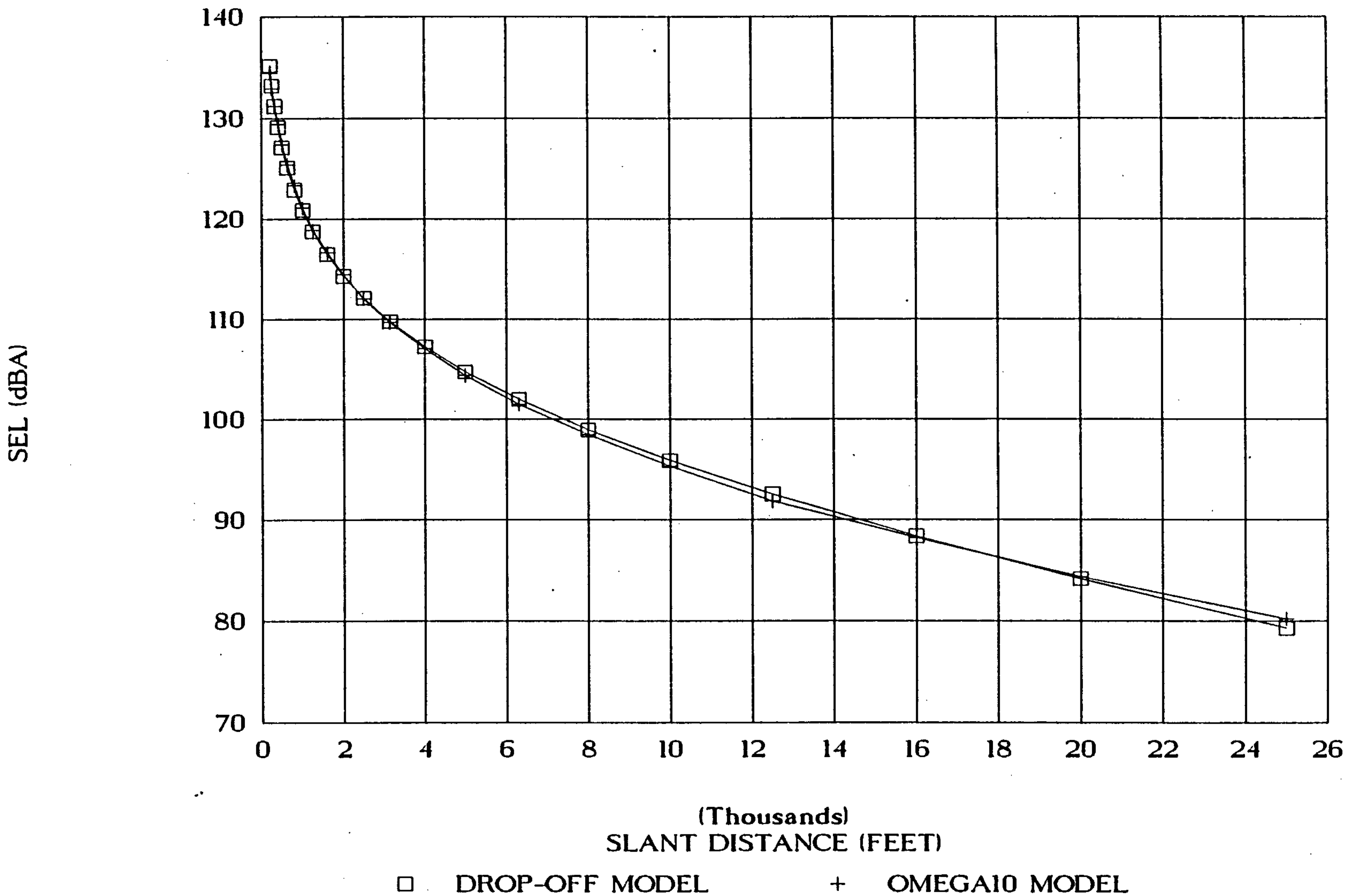


Figure F-13

F/A-18C/D SEL DROP-OFF CALIBRATION

AFTERBURNER, 5.4 dB & 0.175 dB/100 M

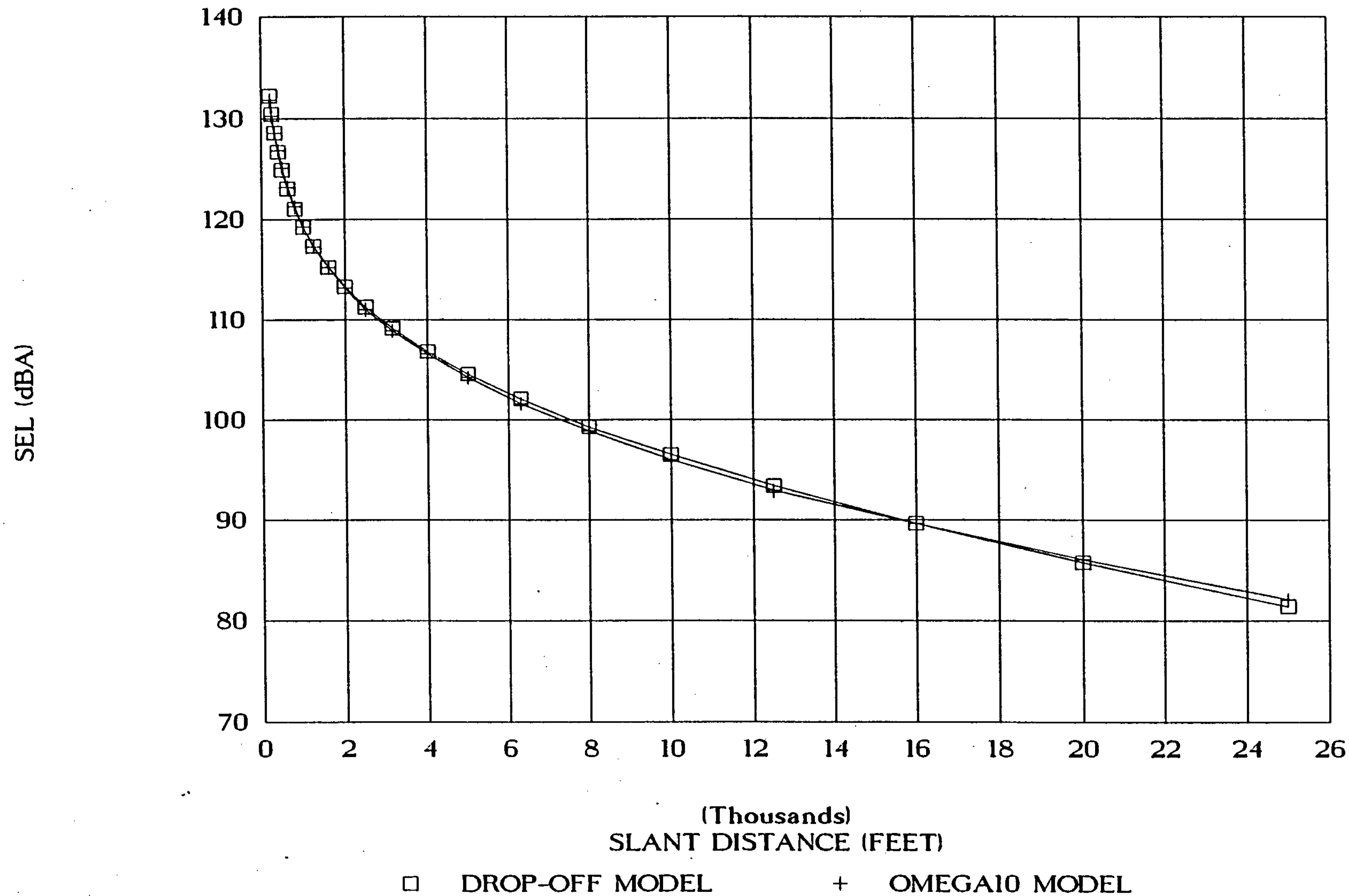


Figure F-14

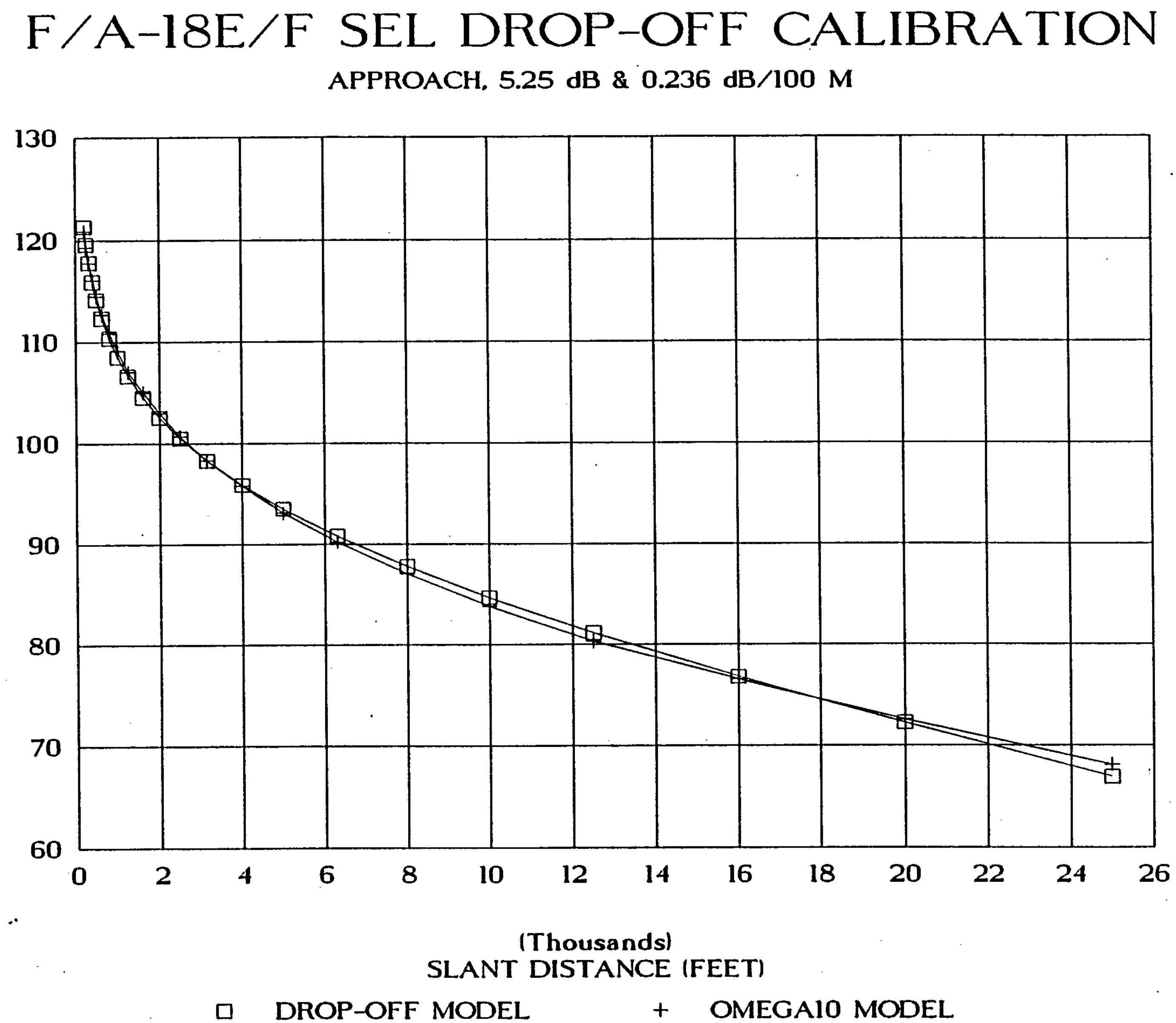

F/A-18E/F SEL DROP-OFF CALIBRATION
APPROACH, 5.25 dB & 0.236 dB/100 M
130
120
110
100
90
80
70
60
SEL (dBA)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
(Thousands)
SLANT DISTANCE (FEET)
DROP-OFF MODEL
OMEGA10 MODEL

Figure F-15

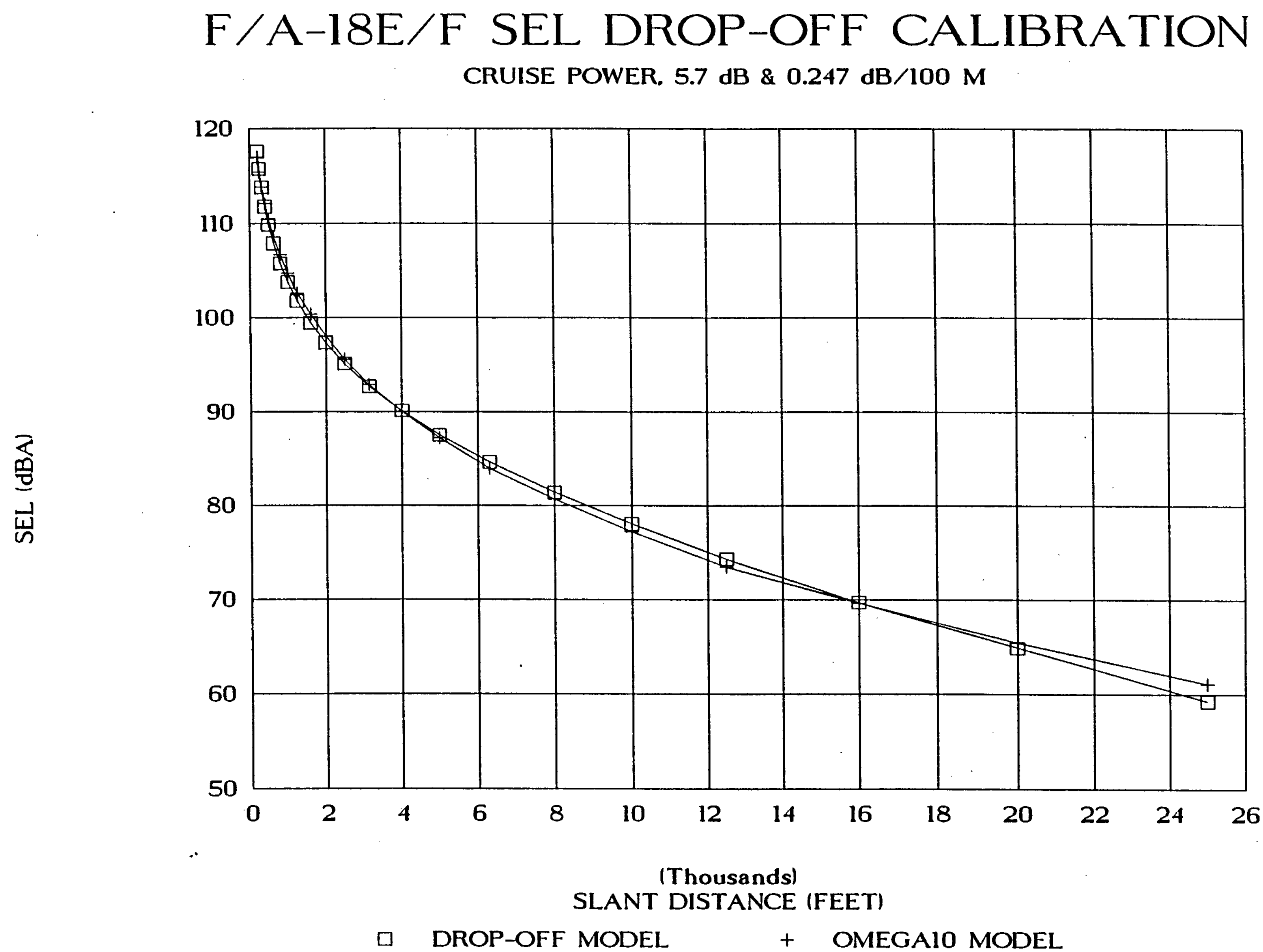

F/A-18E/F SEL DROP-OFF CALIBRATION
CRUISE POWER, 5.7 dB & 0.247 dB/100 M
SEL (dBA)
120
110
100
90
80
70
60
50
0
2
4
6
8
10
12
14
16
18
20
22
24
26
(Thousands)
SLANT DISTANCE (FEET)
□ DROP-OFF MODEL
+ OMEGA10 MODEL

Figure F-16

F/A-18E/F SEL DROP-OFF CALIBRATION

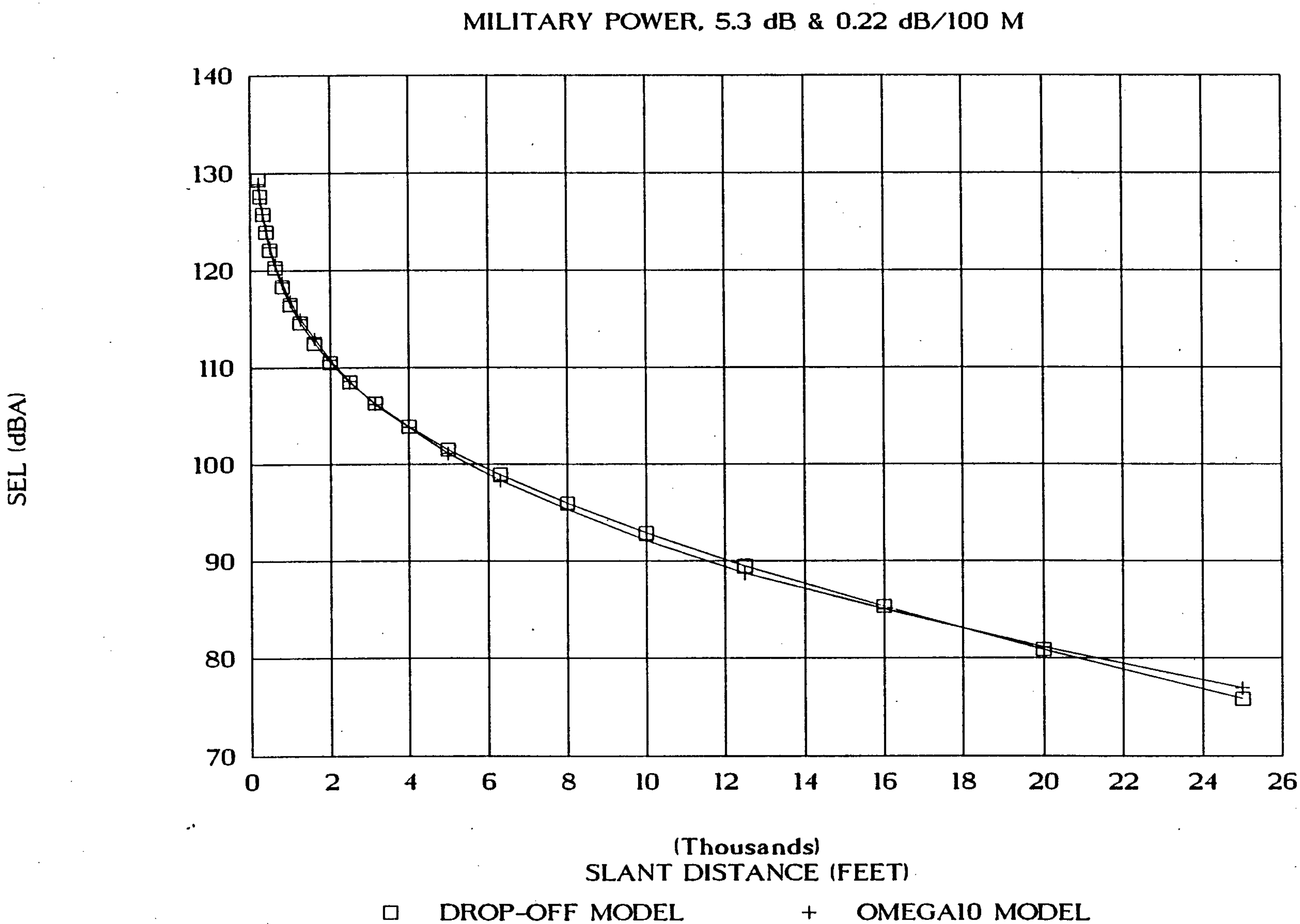
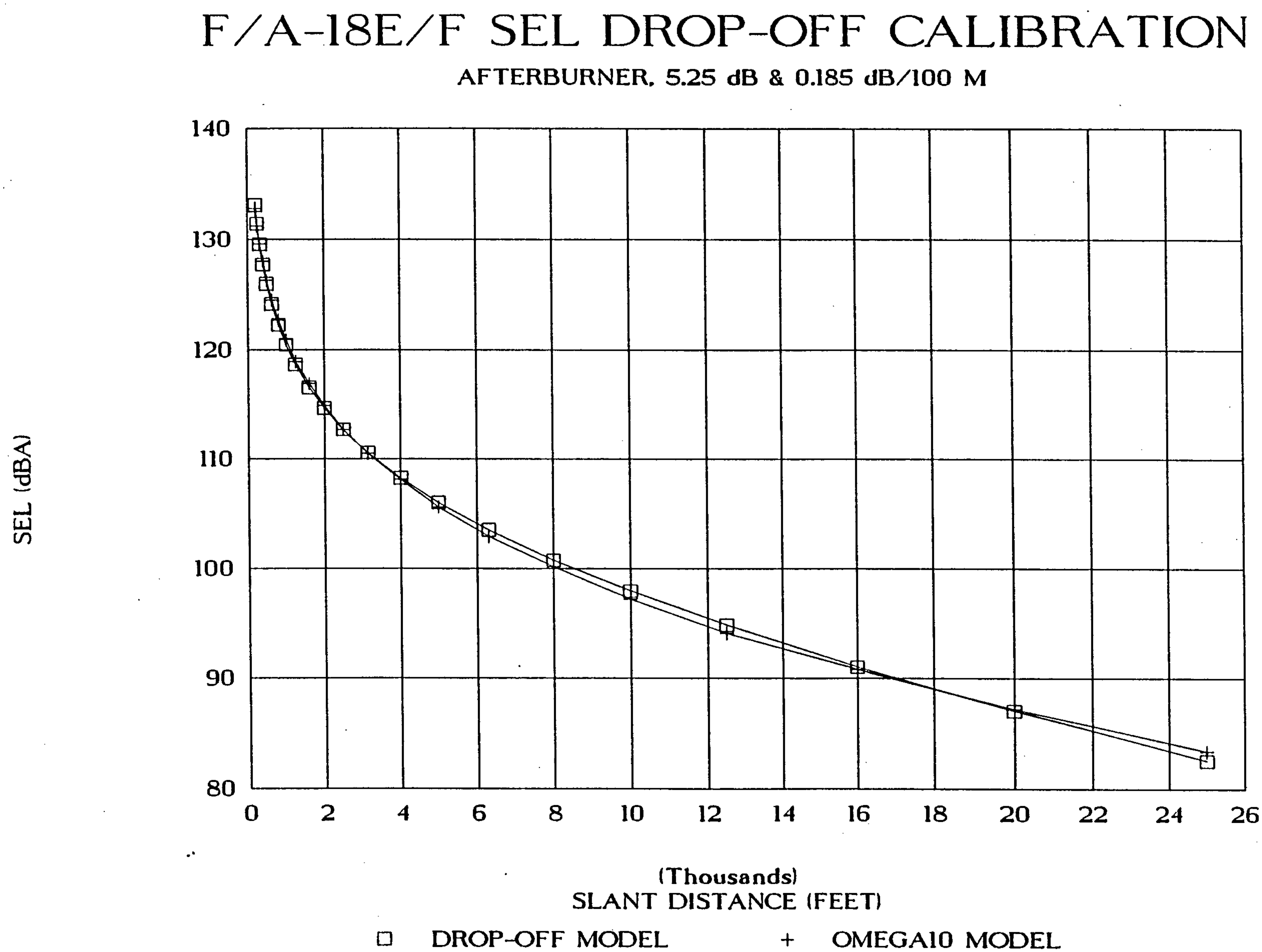


Figure F-17



F/A-18E/F SEL DROP-OFF CALIBRATION
AFTERBURNER, 5.25 dB & 0.185 dB/100 M
SEL (dBA)
140
130
120
110
100
90
80
0
2
4
6
8
10
12
14
16
18
20
22
24
26
(Thousands)
SLANT DISTANCE (FEET)
DROP-OFF MODEL
OMEGA10 MODEL

TABLE F-14. SUMMARY OF PEAK FLYOVER EVENT NOISE LEVELS (dBA) FOR F/A-18 AIRCRAFT

SLANT DISTANCE (FEET)	AFTERBURNER TAKEOFF 250 KNOTS		MILITARY/IRP CLIMBOUT 250 KNOTS		LANDING APPROACH 150 KNOTS		HOLDING PATTERN 250 KNOTS		CRUISE POWER 300 KNOTS		MILITARY POWER 420 KNOTS		MILITARY/IRP POWER 420 KNOTS		AFTERBURNER POWER 500 KNOTS	
	F/A-18C/D (101% RPM)	F/A-18E/F (97% RPM)	F/A-18C/D (101% RPM)	F/A-18E/F (96% RPM)	F/A-18C/D (89% RPM)	F/A-18E/F (84% RPM)	F/A-18C/D (82% RPM)	F/A-18E/F (80% RPM)	F/A-18C/D (85% RPM)	F/A-18E/F (83% RPM)	F/A-18C/D (92% RPM)	F/A-18E/F (85% RPM)	F/A-18C/D (101% RPM)	F/A-18E/F (96% RPM)	F/A-18C/D (101% RPM)	F/A-18E/F (97% RPM)
200	131.8	127.9	129.0	124.1	117.1	121.4	102.3	108.9	100.6	110.8	118.08	113.53	130.2	123.2	133.7	126.8
300	128.6	124.7	125.5	120.9	108.6	113.0	93.8	99.7	97.4	107.4	114.54	110.37	126.6	120.0	130.5	123.7
400	126.3	122.5	122.9	118.7	107.1	111.5	92.3	98.2	95.2	105.0	112.01	108.10	124.1	117.7	128.2	121.5
500	124.5	120.8	121.0	116.9	104.5	108.9	89.7	95.4	93.4	103.1	110.04	106.33	122.1	116.0	126.4	119.7
600	123.0	119.3	119.3	115.4	103.9	108.3	89.1	94.7	91.9	101.5	108.42	104.86	120.5	114.5	124.9	118.3
700	121.8	118.1	118.0	114.2	103.3	107.7	88.5	94.1	90.7	100.2	107.04	103.62	119.1	113.3	123.7	117.1
800	120.7	117.0	116.8	113.1	102.6	107.1	87.8	93.4	89.6	99.0	105.83	102.53	117.9	112.2	122.6	116.0
900	119.7	116.1	115.7	112.1	101.7	106.2	86.9	92.4	88.6	98.0	104.76	101.56	116.9	111.2	121.6	115.0
1,000	118.8	115.2	114.7	111.3	100.7	105.1	85.9	91.2	87.8	97.0	103.80	100.69	115.9	110.3	120.7	114.2
1,250	117.0	113.4	112.7	109.4	99.8	104.2	85.0	90.3	85.9	95.0	101.74	98.82	113.8	108.5	118.9	112.3
1,500	115.4	111.9	110.9	107.8	98.7	103.2	83.9	89.1	84.3	93.3	100.03	97.25	112.1	106.9	117.3	110.8
1,750	114.1	110.6	109.5	106.5	95.4	99.8	80.6	85.5	83.0	91.8	98.56	95.91	110.7	105.6	116.0	109.5
2,000	112.9	109.4	108.2	105.3	92.9	97.4	78.1	82.9	81.8	90.6	97.27	94.72	109.4	104.4	114.8	108.4
2,500	110.9	107.4	106.0	103.2	90.9	95.3	76.1	80.6	79.7	88.3	95.06	92.68	107.2	102.3	112.8	106.4
3,000	109.2	105.8	104.1	101.5	89.1	93.6	74.3	78.8	78.0	86.5	93.21	90.95	105.3	100.6	111.1	104.7
4,000	106.4	103.0	101.1	98.6	85.9	90.4	71.1	75.3	75.1	83.4	90.15	88.08	102.3	97.7	108.3	102.0
5,000	104.2	100.8	98.6	96.3	83.9	88.3	69.1	73.1	72.7	80.8	87.66	85.70	99.8	95.4	106.1	99.7
6,000	102.2	98.8	96.4	94.2	83.2	87.6	68.4	72.3	70.6	78.5	85.51	83.64	97.6	93.3	104.1	97.8
7,000	100.5	97.1	94.5	92.3	82.8	87.2	68.0	71.9	68.8	76.5	83.60	81.79	95.7	91.4	102.4	96.1
8,000	98.9	95.5	92.8	90.7	81.6	86.0	66.8	70.7	67.1	74.6	81.87	80.10	94.0	89.7	100.8	94.5
9,000	97.5	94.1	91.2	89.1	78.8	83.1	64.0	67.6	65.5	72.9	80.28	78.52	92.4	88.2	99.3	93.0
10,000	96.1	92.7	89.7	87.6	74.5	78.8	59.7	62.9	64.0	71.3	78.80	77.05	90.9	86.7	98.0	91.7
12,500	93.0	89.6	86.3	84.2	67.6	71.7	52.8	55.4	60.6	67.6	75.42	73.67	87.5	83.3	94.9	88.6
15,000	90.3	86.8	83.3	81.2	67.3	71.4	52.5	55.1	57.5	64.2	72.40	70.60	84.5	80.2	92.2	85.8

TABLE F-15. NAVY F/A-18 SORTIES IN THE R-2508 COMPLEX, NAS LEMOORE ALTERNATIVE

R-2508 SORTIE COMPONENT	1997 BASELINE	END OF PHASE 1 (2004)	END OF PHASE 2 (2010)
NASMOD 1997 C/D FRS SQUADRON SORTIES TO R-2508:	5,767		
NASMOD 1997 C/D FLEET SQUADRON SORTIES TO R-2508:	4,133		
NASMOD 1997 NASL C/D SORTIES TO R-2508 WORK AREAS:	9,094		
NASMOD 1997 NASL C/D SORTIES TO ECHO RANGE:	0		
NASMOD 1997 NASL C/D SORTIES TO SUPERIOR VALLEY:	806		
NASMOD 1997 NAS LEMOORE R-2508 C/D SORTIES:	9,900		
1997 AIR NATIONAL GUARD SORTIES TO R-2508:	2,443		
1997 OTHER MILITARY SORTIES TO R-2508:	22,933		
1997 NON-LEMOORE MILITARY SORTIES TO R-2508:	25,376		
1997 COMMERCIAL FLIGHTS THROUGH R-2508:	38,207		
1997 OTHER PRIVATE FLIGHTS THROUGH R-2508:	973		
1997 PRIVATE/COMMERCIAL FLIGHTS THROUGH R-2508:	39,180		
1997 TOTAL MILITARY SORTIES TO R-2508:	35,276		
1997 TOTAL NONMILITARY FLIGHTS THROUGH R-2508:	39,180		
1997 ESTIMATED TOTAL R-2508 COMPLEX SORTIES:	74,456		
1997 R-2508 SORTIES PER C/D FRS AIRCRAFT (40):	144.2		
1997 R-2508 SORTIES PER C/D FLEET AIRCRAFT (120):	34.4		
NASMOD PHASE 1 E/F FRS SQUADRON R-2508 SORTIES:		5,754	
NASMOD PHASE 1 E/F FLEET SQUADRON R-2508 SORTIES:		1,708	
PHASE 1 SORTIES PER E/F FRS AIRCRAFT (36):		159.8	
PHASE 1 SORTIES PER E/F FLEET AIRCRAFT (56):		30.5	
PHASE 1 SORTIES, E/F FRS SQUADRON (36):		5,754	
PHASE 1 SORTIES, E/F FLEET SQUADRONS (56):		1,708	
PHASE 1 SORTIES, C/D FRS SQUADRON (36):		5,190	
PHASE 1 SORTIES, C/D FLEET SQUADRONS (120):		4,133	
PHASE 2 SORTIES, E/F FRS SQUADRON (36):			5,754
PHASE 2 SORTIES, E/F FLEET SQUADRONS (128):			3,904
PHASE 2 SORTIES, C/D FRS SQUADRON (10):			1,442
PHASE 2 SORTIES, C/D FLEET SQUADRONS (48):			1,653

TABLE F-15. NAVY F/A-18 SORTIES IN THE R-2508 COMPLEX, NAS LEMOORE ALTERNATIVE

R-2508 SORTIE COMPONENT	1997 BASELINE	END OF PHASE 1 (2004)	END OF PHASE 2 (2010)
TOTAL NAS LEMOORE SORTIES TO R-2508:	9,900	16,785	12,753
OTHER MILITARY SORTIES TO R-2508:	25,376	25,376	25,376
ESTIMATED TOTAL R-2508 MILITARY SORTIES:	35,276	42,161	38,129
NAS LEMOORE CONTRIBUTION TO R-2508 MILITARY SORTIES:	28.1%	39.8%	33.4%
PERCENT CHANGE FROM 1997 NASL SORTIES TO R-2508:		69.5%	28.8%
PERCENT CHANGE FROM 1997 R-2508 TOTAL DUE TO F/A-18s:		19.5%	8.1%
TOTAL NAS LEMOORE SORTIES TO R-2508:	9,900	16,785	12,753
OTHER MILITARY/COMMERCIAL/PRIVATE R-2508 SORTIES:	64,556	64,556	64,556
ESTIMATED TOTAL R-2508 SORTIES:	74,456	81,341	77,309
NAS LEMOORE CONTRIBUTION TO TOTAL R-2508 SORTIES:	13.3%	20.6%	16.5%
PERCENT CHANGE FROM 1997 NASL SORTIES TO R-2508:		69.5%	28.8%
PERCENT CHANGE FROM 1997 R-2508 TOTAL DUE TO F/A-18s:		9.2%	3.8%

Notes: NAS Lemoore sortie data from the 1997 NASMOD study (ATAC Corporation 1997).
Other R-2508 use data from Table 3-1 of the EIS (R-2508 CCF, 1997).
All 1997 NAS Lemoore C/D sorties to Superior Valley were conducted by the existing C/D FRS squadron.
The existing NAS Lemoore C/D FRS squadron will be reduced from 40 aircraft to 36 aircraft by the end of Phase 1, and to 10 aircraft by the end of Phase 2.
NAS Lemoore E/F Fleet squadrons will use the R-2508 work areas.
NAS Lemoore E/F FRS squadron aircraft will use the R-2508 work areas, Echo Range, and Superior Valley.

TABLE F-16. NAVY F/A-18 SORTIES IN THE R-2508 COMPLEX, NAF EL CENTRO ALTERNATIVE

R-2508 SORTIE COMPONENT (NAS LEMOORE PLUS NAF EL CENTRO F/A-18 SQUADRONS)	1997 BASELINE	END OF PHASE 1 (2004)	END OF PHASE 2 (2010)
NASMOD 1997 C/D FRS SQUADRON SORTIES TO R-2508:	5,767		
NASMOD 1997 C/D FLEET SQUADRON SORTIES TO R-2508:	4,133		
NASMOD 1997 NASL C/D SORTIES TO R-2508 WORK AREAS:	9,094		
NASMOD 1997 NASL C/D SORTIES TO ECHO RANGE:	0		
NASMOD 1997 NASL C/D SORTIES TO SUPERIOR VALLEY:	806		
	....		
NASMOD 1997 NAS LEMOORE R-2508 C/D SORTIES:	9,900		
1997 AIR NATIONAL GUARD SORTIES TO R-2508:	2,443		
1997 OTHER MILITARY SORTIES TO R-2508:	22,933		
	....		
1997 NON-LEMOORE MILITARY SORTIES TO R-2508:	25,376		
1997 COMMERCIAL FLIGHTS THROUGH R-2508:	38,207		
1997 OTHER PRIVATE FLIGHTS THROUGH R-2508:	973		
	....		
1997 PRIVATE/COMMERCIAL FLIGHTS THROUGH R-2508:	39,180		
1997 TOTAL MILITARY SORTIES TO R-2508:	35,276		
1997 TOTAL NONMILITARY FLIGHTS THROUGH R-2508:	39,180		
	....		
1997 ESTIMATED TOTAL R-2508 COMPLEX SORTIES:	74,456		
1997 R-2508 SORTIES PER C/D FRS AIRCRAFT (40):	144.2		
1997 R-2508 SORTIES PER C/D FLEET AIRCRAFT (120):	34.4		
FIT ESTIMATE, PHASE 1 E/F FRS SQUADRON R-2508 SORTIES:		3,927	
FIT ESTIMATE, PHASE 1 E/F FLEET SQUADRON R-2508 SORTIES:		870	
PHASE 1 SORTIES PER E/F FRS AIRCRAFT (36):		109.1	
PHASE 1 SORTIES PER E/F FLEET AIRCRAFT (56):		15.5	
PHASE 1 SORTIES, E/F FRS SQUADRON (36):		3,927	
PHASE 1 SORTIES, E/F FLEET SQUADRONS (56):		870	
PHASE 1 SORTIES, C/D FRS SQUADRON (36):		5,190	
PHASE 1 SORTIES, C/D FLEET SQUADRONS (120):		4,133	
PHASE 2 SORTIES, E/F FRS SQUADRON (36):			3,927
PHASE 2 SORTIES, E/F FLEET SQUADRONS (128):			1,989
PHASE 2 SORTIES, C/D FRS SQUADRON (10):			1,442
PHASE 2 SORTIES, C/D FLEET SQUADRONS (48):			1,653

TABLE F-16. NAVY F/A-18 SORTIES IN THE R-2508 COMPLEX, NAF EL CENTRO ALTERNATIVE

R-2508 SORTIE COMPONENT (NAS LEMOORE PLUS NAF EL CENTRO F/A-18 SQUADRONS)	1997 BASELINE	END OF PHASE 1 (2004)	END OF PHASE 2 (2010)
TOTAL NAVY F/A-18 SORTIES TO R-2508:	9,900	14,120	9,011
OTHER MILITARY SORTIES TO R-2508:	25,376	25,376	25,376
ESTIMATED TOTAL R-2508 MILITARY SORTIES:	35,276	39,496	34,387
NAVY F/A-18 CONTRIBUTION TO R-2508 MILITARY SORTIES:	28.1%	35.8%	26.2%
PERCENT CHANGE FROM 1997 F/A-18 SORTIES TO R-2508:		42.6%	-9.0%
PERCENT CHANGE FROM 1997 R-2508 TOTAL DUE TO F/A-18s:		12.0%	-2.5%
TOTAL NAVY F/A-18 SORTIES TO R-2508:	9,900	14,120	9,011
OTHER MILITARY/COMMERCIAL/PRIVATE R-2508 SORTIES:	64,556	64,556	64,556
ESTIMATED TOTAL R-2508 SORTIES:	74,456	78,676	73,567
NAVY F/A-18 CONTRIBUTION TO TOTAL R-2508 SORTIES:	13.3%	17.9%	12.2%
PERCENT CHANGE FROM 1997 F/A-18 SORTIES TO R-2508:		42.6%	-9.0%
PERCENT CHANGE FROM 1997 R-2508 TOTAL DUE TO F/A-18s:		5.7%	-1.2%

Notes: 1997 baseline NAS Lemoore sortie data from the 1997 NASMOD study (ATAC Corporation 1997).
Other 1997 baseline R-2508 use data from Table 3-1 of the EIS (R-2508 CCF, 1997).
Phase 1 and Phase 2 E/F aircraft sorties to R-2508 estimated by FIT personnel at NAS Lemoore, using data from the 1997 NASMOD study.
All 1997 NAS Lemoore C/D sorties to Superior Valley were conducted by the existing C/D FRS squadron.
Total F/A-18 sorties to R-2508 include C/D squadrons remaining at NAS Lemoore plus E/F squadrons based at NAF El Centro.
The existing NAS Lemoore C/D FRS squadron will be reduced from 40 aircraft to 36 aircraft by the end of Phase 1, and to 10 aircraft by the end of Phase 2.
NAF El Centro E/F Fleet squadrons will use the R-2508 work areas.
NAF El Centro E/F FRS squadron aircraft will use the R-2508 work areas, Echo Range, and Superior Valley.

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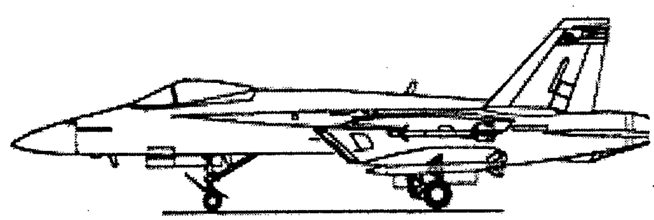


APPENDIX G
BIOLOGICAL RESOURCES

US FISH AND WILDLIFE CONSULTATION

G-1

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821

IN REPLY REFER TO:

1-1-97-I-2221

October 20, 1997

Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066

Subject: Review of the Notice of Preparation of an Environmental Impact Statement for West Coast Basing of Navy Aircraft at Lemoore Naval Air Station, Kings and Fresno Counties, California

Mr. Sam Dennis:

This responds to your September 25, 1997, request for a review of the Notice of Preparation for an Environmental Impact Statement for West Coast Basing of Navy Aircraft at Lemoore Naval Air Station, Kings and Fresno Counties, California. The attached enclosures are intended to assist you in the early environmental review of your proposal. Consultation with the U.S. Fish and Wildlife Service (Service) may be required under provisions of the Fish and Wildlife Coordination Act or Endangered Species Act of 1973, as amended, if project activities may affect federally listed species or impact jurisdictional wetlands.

Enclosure A provides a list of sensitive species that may occur in or near the project site and general survey guidelines. The Service recommends that surveys be completed by a qualified biologist on the proposed project site to confirm the presence or absence of special status species and their habitats. Enclosure B recommends general guidelines for identifying and mitigating project impacts to fish, wildlife, and their habitats. The Council on Environmental Quality developed regulations for implementing the National Environmental Policy Act (NEPA), and defines mitigation to include: (1) avoiding the impact; (2) minimizing the impact; (3) rectifying the impact; (4) reducing or eliminating the impact over time; and (5) compensating for impacts. The Service supports and adopts this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process. Accordingly, we maintain that the best way to mitigate for the adverse biological effect is avoidance when possible.

Mr. Sam Dennis

We encourage you to use these guidelines to develop a comprehensive environmental document that addresses these needs. If you have any questions regarding these comments, please contact Mr. Don Hovik at (916) 979-2732, extension 345.

Sincerely,

Wayne S. White
Field Supervisor

Enclosures

ENCLOSURE A

Endangered and Threatened Species that May Occur In or be Affected by Projects in the Area of the Following California County or Counties

October 13, 1997

FRESNO COUNTY

Listed Species

Mammals

giant kangaroo rat, *Dipodomys ingens* (E)

Fresno kangaroo rat, *Dipodomys nitratoides exilis* (E)

Fresno kangaroo rat critical habitat, *Dipodomys nitratoides exilis* (E)

Tipton kangaroo rat, *Dipodomys nitratoides nitratoides* (E)

San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

California condor, *Gymnogyps californianus* (E)

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) silus* (E)

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Paiute cutthroat trout, *Oncorhynchus (=Salmo) clarki seleniris* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

California jewelflower, *Caulanthus californicus* (E)

palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)

San Joaquin wooly-threads, *Lembertia congdonii* (E)

FRESNO COUNTY

Listed Species

Plants

San Benito evening-primrose, *Camissonia benitensis* (T)

fleshy owl's-clover, *Castilleja campestris ssp. succulenta* (T)

Hoover's wooly-star, *Eriastrum hooveri* (T)

San Joaquin Valley Orcutt grass, *Orcuttia inaequalis* (T)

San Joaquin adobe sunburst, *Pseudobahia peirsonii* (T)

Greene's tuctoria, *Tuctoria greenei* (E)

Proposed Species

Fish

Central Valley steelhead, *Oncorhynchus mykiss* (PE)

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Plants

Mariposa pussy-paws, *Calyptridium pulchellum* (PE)

carpenteria, *Carpenteria californica* (PT)

Candidate Species

Mammals

San Joaquin Valley woodrat, *Neotoma fuscipes riparia* (C)

Birds

mountain plover, *Charadrius montanus* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

Nelson's antelope ground squirrel, *Ammospermophilus nelsoni* (SC)

short-nosed kangaroo rat, *Dipodomys nitratoides brevinasus* (SC)

spotted bat, *Euderma maculatum* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

California wolverine, *Gulo gulo luteus* (SC)

FRESNO COUNTY

Species of Concern

Mammals

- Pacific fisher, *Martes pennanti pacifica* (SC)
- small-footed myotis bat, *Myotis ciliolabrum* (SC)
- long-eared myotis bat, *Myotis evotis* (SC)
- fringed myotis bat, *Myotis thysanodes* (SC)
- long-legged myotis bat, *Myotis volans* (SC)
- Yuma myotis bat, *Myotis yumanensis* (SC)
- Southern grasshopper mouse, *Onychomys torridus ramona* (SC)
- Tulare grasshopper mouse, *Onychomys torridus tularensis* (SC)
- California bighorn sheep, *Ovis canadensis californiana* (SC)
- San Joaquin pocket mouse, *Perognathus inornatus* (SC)
- pale Townsend's big-eared bat, *Plecotus townsendii pallescens* (SC)
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- Mt. Lyell shrew, *Sorex lyelli* (SC)
- Sierra Nevada red fox, *Vulpes vulpes necator* (SC)

Birds

- northern goshawk, *Accipiter gentilis* (SC)
- tricolored blackbird, *Agelaius tricolor* (SC)
- western burrowing owl, *Athene cunicularia hypugea* (SC)
- Swainson's hawk, *Buteo Swainsoni* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- white-faced ibis, *Plegadis chihi* (SC)
- California spotted owl, *Strix occidentalis occidentalis* (SC)

Reptiles

- silvery legless lizard, *Anniella pulchra pulchra* (SC)
- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- southwestern pond turtle, *Clemmys marmorata pallida* (SC)
- San Joaquin whipsnake, *Masticophis flagellum ruddocki* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- Yosemite toad, *Bufo canorus* (SC)
- Mount Lyell salamander, *Hydromantes platycephalus* (SC)

FRESNO COUNTY

Species of Concern

Amphibians

- foothill yellow-legged frog, *Rana boylii* (SC)
- mountain yellow-legged frog, *Rana muscosa* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

- green sturgeon, *Acipenser medirostris* (SC)
- river lamprey, *Lampetra ayresi* (SC)
- Kern brook lamprey, *Lampetra hubbsi* (SC)
- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

- Ciervo aegialian scarab beetle, *Aegialia concinna* (SC)
- San Joaquin tiger beetle, *Cicindela tranquebarica ssp* (SC)
- San Joaquin dune beetle, *Coelus gracilis* (SC)
- Kings Canyon cryptochian caddisfly, *Cryptochia excella* (SC)
- Wooly hydroporus diving beetle, *Hydroporus diving beetle* (SC)
- Hopping's blister beetle, *Lytta hoppingi* (SC)
- moestan blister beetle, *Lytta moesta* (SC)
- molestan blister beetle, *Lytta molesta* (SC)
- Morrison's blister beetle, *Lytta morrisoni* (SC)
- Dry Creek cliff strider bug, *Oravelia pege* (SC)
- Bohart's blue butterfly, *Philotiella speciosa bohartorum* (SC)
- Sierra pygmy grasshopper, *Tetrix sierrana* (SC)

Plants

- obovate-leaved thornmint, *Acanthomintha obovata ssp. obovata* (SC)
- forked fiddleneck, *Amsinckia vernicosa var. furcata* (SC)
- Bodie Hills rock-cress, *Arabis bodiensis* (SC)
- Raven's milk-vetch, *Astragalus monoensis var. ravenii* (SC)
- heartscale, *Atriplex cordulata* (SC)
- brittlescale, *Atriplex depressa* (SC)
- Lost Hills saltbush, *Atriplex vallicola* (SC)
- South Coast Range morning-glory, *Calystegia collina ssp. venusta* (SC)
- Mono Hot Springs evening-primrose, *Camissonia sierrae ssp. alticola* (SC)

FRESNO COUNTY

Species of Concern

Plants

San Benito spineflower, *Chorizanthe biloba var. immemora* (SC)
Fresno County bird's-beak, *Cordylanthus tenuis ssp. barbatus* (SC)
recurved larkspur, *Delphinium recurvatum* (SC)
mouse buckwheat, *Eriogonum nudum var. murinum* (SC)
spiny-sepaled coyote-thistle, *Eryngium spinosepalum* (SC)
hollisteria, *Hollisteria lanata* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
rayless layia, *Layia discoidea* (SC)
Panoche peppergrass, *Lepidium jaredii var. album* (SC)
long-petaled lewisia, *Lewisia longipetala* (SC)
orange lupine, *Lupinus citrinus var. citrinus* (SC)
valley sagittaria, *Sagittaria sanfordii* (SC)
parasol clover, *Trifolium bolanderi* (SC)
lesser saltscale, *Atriplex minuscula* (SC)
pale-yellow layia, *Layia heterotricha* (SC)

KINGS COUNTY

Listed Species

Mammals

giant kangaroo rat, *Dipodomys ingens* (E)
Fresno kangaroo rat, *Dipodomys nitratoides exilis* (E)
Tipton kangaroo rat, *Dipodomys nitratoides nitratoides* (E)
San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)
California condor, *Gymnogyps californianus* (E)
Aleutian Canada goose, *Branta canadensis leucopareia* (T)
bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) silus* (E)
giant garter snake, *Thamnophis gigas* (T)

KINGS COUNTY

Listed Species

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

San Joaquin wooly-threads, *Lembertia congdonii* (E)

Hoover's wooly-star, *Eriastrum hooveri* (T)

California jewelflower, *Caulanthus californicus* (E)

Proposed Species

Fish

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Candidate Species

Birds

mountain plover, *Charadrius montanus* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

Nelson's antelope ground squirrel, *Ammospermophilus nelsoni* (SC)

short-nosed kangaroo rat, *Dipodomys nitratoides brevinasus* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

KINGS COUNTY

Species of Concern

Mammals

Yuma myotis bat, *Myotis yumanensis* (SC)

Southern grasshopper mouse, *Onychomys torridus ramona* (SC)

Tulare grasshopper mouse, *Onychomys torridus tularensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)

Sierra Nevada red fox, *Vulpes vulpes necator* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

Swainson's hawk, *Buteo Swainsoni* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (SC)

white-faced ibis, *Plegadis chihi* (SC)

San Joaquin LeConte's thrasher, *Toxostoma lecontei macmillanorum* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

San Joaquin whipsnake, *Masticophis flagellum ruddocki* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

Kern brook lamprey, *Lampetra hubbsi* (SC)

Invertebrates

Ciervo aegialian scarab beetle, *Aegialia concinna* (SC)

San Joaquin dune beetle, *Coelus gracilis* (SC)

molestan blister beetle, *Lytta molesta* (SC)

Doyen's trigonascuta dune weevil, *Trigonoscuta doyeni* (SC)

KINGS COUNTY

Species of Concern

Plants

- forked fiddleneck, *Amsinckia vernicosa var. furcata* (SC)
- heartscale, *Atriplex cordulata* (SC)
- Lost Hills saltbush, *Atriplex vallicola* (SC)
- slough thistle, *Cirsium crassicaule* (SC)
- recurved larkspur, *Delphinium recurvatum* (SC)
- pale-yellow layia, *Layia heterotricha* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)	Possibly extinct.	
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE B

Endangered Species. This enclosure identifies those listed, proposed, and/or candidate species that may occur in the proposed project area. Information and maps concerning candidate species in California may be obtained from the California Natural Diversity Data Base, a program administered by the California Department of Fish and Game. Requests for information should be addressed to the Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814. The marketing manager may be contacted by calling (916) 324-0562. You may request additional information from the Chief, California Department of Fish and Game, Non-Game Heritage Program, at (916) 324-8348.

Listed species are fully protected under the mandates of the Endangered Species Act (Act), as amended. Section 9 of the Act and its implementing regulations prohibit the "take" of a federally listed fish and wildlife species by any person, as defined by the Act. Take is defined by the Act "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such species. Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR § 17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures. If a Federal agency is involved with the permitting, funding, or carrying out of this project, initiation of formal consultation is required between that agency and the Service pursuant to section 7 of the Act if it is determined that the proposed project may affect a federally listed species. Federal agencies must confer if they determine that the continued existence of a proposed species may be jeopardized by the project. Such consultation or conference could result in a biological opinion that addresses anticipated effects of the project to listed and proposed species. The biological opinion may authorize a limited level of incidental take for federally listed species.
If a Federal agency is not involved with the project, and federally listed species may be taken as part of the project, then an "incidental take" permit pursuant to section 10(a) of the Act should be obtained. The Service may issue such a permit upon completion by the permit applicant of a satisfactory conservation plan for the listed species that may be affected by the project.

We recommend that appropriately designed surveys for listed, proposed, or candidate species be undertaken by qualified biologists. Surveys for plants should not be restricted to the identified species; instead, a complete botanical inventory of the project site should be conducted. Botanical surveys should be conducted at intervals throughout the spring and summer, in order to maximize the likelihood of encountering each species during the season most appropriate for accurate identification. Surveys should be based on field inspection, and not on prediction of occurrence based on habitat or physical features of the site. Guidelines for conducting adequate botanical surveys are available from the Natural Heritage Division of the California Department of Fish and Game at (916) 322-2493.

The results of all biological surveys should be published in the environmental impact report. The report should include a brief discussion of survey methods (including sampling methods and timing of surveys), results (including a list of all species encountered as well as maps of vegetation types, populations of plant species, and breeding, nesting or burrowing sites or other habitat components important to animal species), and conclusions. If it is concluded that a given sensitive species is not present, the justification for this conclusion should be fully explained.

Should these surveys determine that listed, proposed, or candidate species may be affected by the proposed project, the Service recommends that the project proponent, in consultation with this office and the California Department of Fish and Game, develop a plan that mitigates for the project's direct and indirect impacts to these species and compensates for project-related loss of habitat. The mitigation plan also should be included in the environmental impact report.

One of the benefits of considering candidate species as well as listed and proposed species early in the planning process is that by exploring alternatives, it may be possible to avoid conflicts that could develop, should a candidate species become listed before the project is complete. In addition, in instances where the Service addresses proposed projects under its Fish and Wildlife Coordination Act authority, we must also analyze the impacts on candidate species and make recommendations to mitigate any adverse effects.

ENCLOSURE C

The goal of the U.S. Fish and Wildlife Service is to conserve, protect and enhance fish, wildlife, and their habitats by timely and effective provision of fish and wildlife information and recommendations. To assist us in accomplishing this goal, we would like to see the items described below discussed in your environmental documents for the proposed project.

Project Description. The document should very clearly state the purposes of, and document the needs for, the proposed project so that the capabilities of the various alternatives to meet the purposes and needs can be readily determined.

A thorough description of all permanent and temporary facilities to be constructed and work to be done as a part of the project should be included. The document should identify any new access roads, equipment staging areas, and gravel processing facilities which are needed. Figures accurately depicting proposed project features in relation to natural features (such as streams, wetlands, riparian areas, and other habitat types) in the project area should be included.

Affected Environment. The document should show the location of, and describe, all vegetative cover types in the areas potentially affected by all project alternatives and associated activities. Tables with acreage of each cover type with and without the project for each alternative would also be appropriate. We recommend that all wetlands in the project area be delineated and described according to the classification system found in the Service's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin 1979). The Service's National Wetland Inventory maps would be one starting point for this effort.

The document should present and analyze a full range of alternatives to the proposed project. At least one alternative should be designed to avoid all impacts to wetlands, including riparian areas. Similarly, within each alternative, measures to minimize or avoid impacts to wetlands should be included.

Lists of fish and wildlife species expected to occur in the project area should be in the document. The lists should also indicate for each species whether or not it is a resident or migrant, and the period(s) of the year it would be expected in the project area.

Environmental Consequences. The sections on impacts to fish and wildlife should discuss impacts from vegetation removal (both permanent and temporary), filling or degradation of wetlands, interruption of wildlife migration corridors, and disturbance from trucks and other machinery during construction and/or operation. These sections should also analyze possible impacts to streams from construction of outfall structures, pipeline crossings, and filling. Impacts on water quality, including nutrient loading, sedimentation, toxics, biological oxygen demand, and temperature in receiving waters should also be discussed in detail along with the resultant effects on fish and aquatic invertebrates. Discussion of indirect impacts to fish, wildlife, and their habitats, including impacts from growth induced by the proposed project, should also be addressed in the document. The impacts of each alternative should be discussed in sufficient detail to allow comparison between the alternatives.

The cumulative impacts of the project, when viewed in conjunction with other past, existing, and foreseeable projects, need to be addressed. Cumulative impacts to fish, wildlife, wetlands and other habitats, and water quality should be included.

Mitigation Planning. Under provisions of the Fish and Wildlife Coordination Act, the Service advises the U.S. Army Corps of Engineers on projects involving dredge and fill activities in "waters of the United States", of which wetlands and some riparian habitats are subcategories. Since portions of this proposal may ultimately require a Corps permit, the Service will subsequently be involved under the Coordination Act. Therefore, if you have not done so already, we suggest that you or your representative consult the Corps regarding onsite wetlands and related habitats that may fall under their jurisdiction, and include this information in the draft document. When reviewing Corps public notices, the Service generally does not object to projects meeting the following criteria:

1. They are ecologically sound;
2. The least environmentally damaging reasonable alternative is selected;
3. Every reasonable effort is made to avoid or minimize damage or loss of fish and wildlife resources and uses;
4. All important recommended means and measures have been adopted, with guaranteed implementation to satisfactorily compensate for unavoidable damage or loss consistent with the appropriate mitigation goal; and
5. For wetlands and shallow water habitats, the proposed activity is clearly water dependent and there is a demonstrated public need.

The Service may recommend the "no project" alternative for those projects which do not meet all of the above criteria, and where there is likely to be a significant fish and wildlife resource loss.

When projects impacting waterways or wetlands are deemed acceptable to the Service, we recommend full mitigation for any impacts to fish and wildlife. The Council on Environmental Quality regulations for implementing the National Environmental Policy Act define mitigation to include: 1) Avoiding the impact; 2) minimizing the impact; 3) rectifying the impact; 4) reducing or eliminating the impact over time; and 5) compensating for impacts. The Service supports and adopts this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process. Accordingly, we maintain that the best way to mitigate for adverse biological impacts is to avoid them altogether.

The document should describe all measures proposed to avoid, minimize, or compensate for impacts to fish and wildlife and their habitats. The measures should be presented in as much detail as possible to allow us to evaluate their probable effectiveness.

Because of their very high value to migratory birds, and their ever-increasing scarcity in California, our mitigation goal for wetlands (including riparian and riverine wetlands) is no net loss of in-kind habitat value or acreage (whichever is greater).

For unavoidable impacts, to determine the mitigation credits available for a given mitigation project, we evaluate what conditions would exist on the mitigation site in the future in the absence of the mitigation actions, and compare those conditions to the conditions we would expect to develop on the site with implementation of the mitigation plan.

Mitigation habitat should be equal to or exceed the quality of the habitat to be affected by the project. Baseline information would need to be gathered at the impact site to be able to quantify this goal in terms of plant species diversity, shrub and tree canopy cover, stems/acre, tree height, etc. The ultimate success of the project should be judged according to these same measurements at the mitigation site.

Criteria should be developed for assessing the progress of the project during its developmental stages as well. Assessment criteria should include rates of plant growth, plant health, and evidence of natural reproduction. Success criteria should be geared toward equaling or exceeding the quality of the highest quality habitat to be affected. In other words, the mitigation effort would be deemed a success in relation to this goal if the mitigation site met or exceeded habitat measurements at a "model" site (plant cover, density, species diversity, etc.).

The plan should present the proposed ground elevations at the mitigation site, along with elevations in the adjacent areas. A comparison of the soils of the proposed mitigation and adjacent areas should also be included in the plan, and a determination made as to the suitability of the soils to support habitats consistent with the mitigation goals.

Because wetland ecosystems are driven by suitable hydrological conditions, additional information must be developed on the predicted hydrology of the mitigation site. The plan should describe the depth of the water table, and the frequency, duration, areal extent, and depth of flooding which would occur on the site. The hydrologic information should include an analysis of extreme conditions (drought, flooding) as well as typical conditions.

The plan must include a timeframe for implementing the mitigation in relation to the proposed project. We recommend that mitigation be initiated prior to the onset of construction. If there will be a substantial time lag between project construction and completion of the mitigation, a net loss of habitat values would result, and more mitigation would be required to offset this loss.

Generally, monitoring of the mitigation site should occur annually for at least the first five years, biennially for years 6 through 11, and every five years thereafter until the mitigation has met all success criteria. Remediation efforts and additional monitoring should occur if success criteria are not met during the first five years. Some projects will require monitoring throughout the life of the project. Reports should be prepared after each monitoring session.

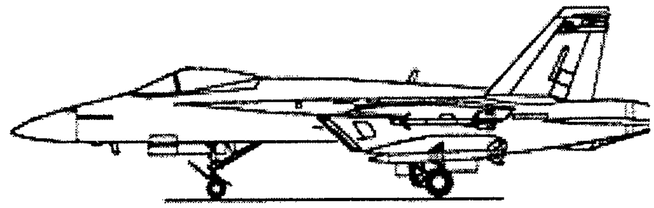
The plan should require the preparation of "as-built" plans. Such plans provide valuable information, especially if the mitigation effort fails. Similarly, a "time-zero" report should be mandated. This report would describe exactly what was done during the construction of the mitigation project, what problems were encountered, and what corrections or modifications to the plans were undertaken.

The plan should detail how the site is to be maintained during the mitigation establishment period, and how long the establishment period will be. It will also be important to note what entity will perform the maintenance activities, and what entity will ultimately own and manage the site. In addition, a mechanism to fund the maintenance and management of the site should be established and identified. A permanent easement should be placed on the property used for the mitigation that would preclude incompatible activities on the site in perpetuity.

Finally, in some cases, a performance bond may be required as part of the mitigation plan. The amount of the bond should be sufficient to cover the costs of designing and implementing an adequate mitigation plan (and purchasing land if needed) should the proposed plan not succeed.

Reference

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington, D.C. 103 pp.



APPENDIX H
R-2508 COMPLEX

R-2508 COMPLEX H-1

R-2508 COMPLEX USER'S HANDBOOK
R-2508 MANAGEMENT AND CONTROL 2-1
R-2508 COMPLEX AIRSPACE AND USE DESCRIPTION 3-1
R-2508 COMPLEX OPERATING PROCEDURES 4-1

R-2508 COMPLEX ENVIRONMENTAL BASELINE STUDY
ENVIRONMENTAL SETTING OF THE R-2508 COMPLEX – LAND USE 3-1
NOISE COMPLAINT PROCESS FOR THE R-2508 COMPLEX 3-54

Appendix H
R-2508 Complex

This appendix includes excerpted text from the R-2508 User's Handbook (May 1997) and the R-2508 Complex Environmental Baseline Study (August 1997). A number of color figures have been copied in conjunction with the excerpted text, however, these figures were not reproduced in color for this document.

R-2508 Complex User's Handbook
The handbook is published under the authority of the Joint Policy and Planning Board (JPPB) and developed by the R-2508 Complex Control Board (CCB). It contains procedures for R-2508 Complex missions, scheduling, and aircrew briefing. Users of the R-2508 Complex are responsible for ensuring compliance with the provisions of the handbook.

The excerpted text describes the entities responsible for management and control of the R-2508 Complex, allowable airspace uses and descriptions, types of allowable activities within R-2508 Complex work areas, operations within sensitive areas, such as national parks and wilderness areas, and operating procedures.

R-2508 Complex Environmental Baseline Study
The purpose of the R-2508 Complex Environmental Baseline Study (EBS) is to provide an information base of current airspace operations and a summary of environmental aspects from with environmental impact assessment process documents and environmental planning actions for new missions within the airspace can be accomplished.

The excerpted text from the EBS describes the complex-wide land use, including military installations, national forests, national parks, Bureau of Land Management resource areas, wilderness areas, wild and scenic rivers, national trails system, military reservations, state lands, Native American reservations, city/county lands, private lands, and airports.

A description of the noise complaint process for the R-2508 Complex also is included. This section contains R-2508 complaint data for 1995, a figure depicting the distribution of noise complaints, subsonic noise levels within the R-2508 Complex, and sensitive noise receptors for the R-2508 Complex.

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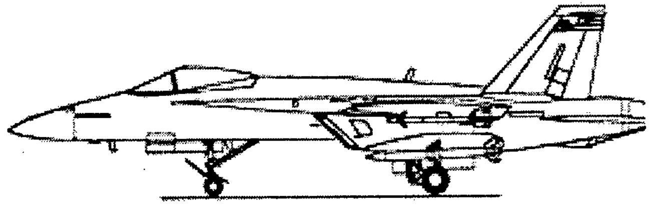


R-2508 COMPLEX USER'S HANDBOOK

R-2508 COMPLEX

USER'S HANDBOOK

1 MAY 1997

CHAPTER 2

R-2508 COMPLEX MANAGEMENT AND CONTROL

2-1. AIRSPACE MANAGEMENT.

a. Management of the R-2508 Complex is the responsibility of the R-2508 Joint Policy and Planning Board (JPPB), founded in 1975 at the direction of the Joint Logistics Commanders and approved by the respective Service Chiefs and the Office of the Secretary of Defense. JPPB members are the Commanders of the NAWCWPNS, China Lake; AFFTC, Edwards AFB; and NTC, Fort Irwin. The JPPB establishes broad operational policy and is the approving authority of all matters dealing with the joint management/control of military activities within the Complex. The mission of the JPPB is the enhancement and preservation of the R-2508 Complex bases, ranges, and special use airspace; and to increase the Department of Defense (DOD) capability for Research, Development, Test, and Evaluation (RDT&E) of aircraft and weapons systems. Additionally, the JPPB preserves an area for operational training and readiness of DOD sponsored activities.

b. The R-2508 Complex Control Board (CCB), established in 1955, is comprised of representatives from each command. The CCB conducts the R-2508 Complex management function. The CCF, under direction of the CCB, is the designated scheduling authority for R-2508 Complex shared-use airspace. The mission of the CCB is to supervise the management of the R-2508 Complex. The CCB assists the JPPB Commanders by formulation of advice and assistance in the conduct of JPPB matters and by relieving them of details in the conduct of day-to-day business such as developing procedures for shared use airspace, resolution of procedural conflicts, and real-time decision making.

c. Within the policy, scope, and limitations imposed by the CCB, the CCF has autonomous authority pertaining to R-2508 Complex shared use airspace utilization when the Complex is scheduled/activated for military use. The CCF exercises authority in matters relating to airspace use and management of the R-2508 Complex; specifically:

(1) To manage, document, and coordinate on a scheduled and real-time basis the airspace utilization and mission requirements of all military and civil users of the R-2508 Complex.

(2) Act as the single point for coordination of R-2508 Complex activities with High Desert TRACON and mission control facilities.

(3) Release and recall of R-2508 Complex airspace.

(4) Administrative support of R-2508 Complex administrative requirements, facilities, equipment, projects, and Operations and Maintenance (O&M) budget.

2-2. CONTROLLING AGENCY. High Desert Terminal Radar Approach Control (TRACON), a FAA Air Traffic Control Facility, is the controlling agency for the R-2508 Complex. TRACON's call sign is "JOSHUA APPROACH."

2-3. USING AGENCY. Internal Restricted Areas. Internal restricted areas within the R-2508 Complex (R-2502N, R-2502E, R-2505, R-2506, R-2515, and R-2524) are scheduled and controlled by their respective "designated Using Agencies." See Chapter 4 for scheduling and operating procedures for internal restricted areas.

CHAPTER 3

R-2508 COMPLEX AIRSPACE AND USE DESCRIPTION

3-1. R-2508 COMPLEX AIRSPACE DESCRIPTION.

a. General. The R-2508 Complex includes all the airspace and associated land presently "owned" and managed by the three principal military activities in the Upper Mojave Desert region: Air Force Flight Test Center (AFFTC), Edwards Air Force Base (AFB); National Training Center (NTC), Fort Irwin, and Naval Air Warfare Center Weapons Division (NAWCWPNS), China Lake. The R-2508 Complex is composed of a number of restricted areas, Military Operations Areas (MOA), and Air Traffic Control Assigned Airspace (ATCAA) areas as defined in the following paragraphs.

b. R-2508 Complex Shared Use Airspace. The Military Operations Areas (MOA) and Air Traffic Control Assigned Airspace (ATCAA) areas are combined with R-2508 to form the four major work areas; Isabella, Owens, Saline, and Panamint. This creates working airspace from near the surface upwards throughout the entire R-2508 Complex. Isabella, Saline, and Panamint work areas have peripheral areas made up of MOA and/or ATCAA airspace to increase the size of the usable airspace (Figure 3-1).

c. R-2508 Complex Special Use Airspace Vertical Boundaries. Descriptions of the lower and upper altitude boundaries for the various types of special use airspaces (Figures 3-1, 3-2, 3-3, and 3-4) are as follows:

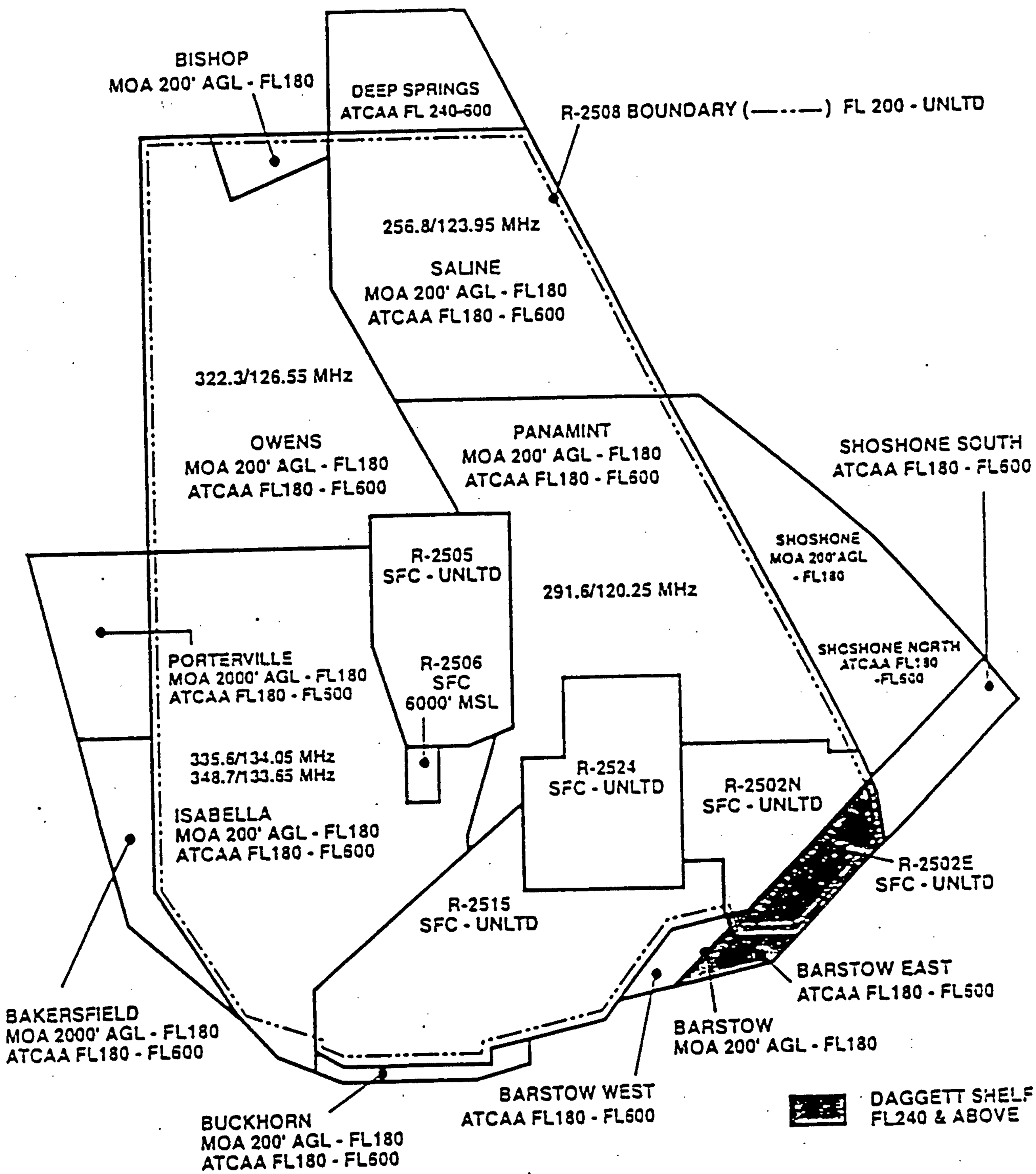
(1) Restricted Areas. Restricted Area R-2508, the major restricted area from which the R-2508 Complex derives its name, extends from FL200 upward to unlimited and is shared use airspace. Individual restricted areas, R-2502N, R-2502E, R-2505, R-2506, R-2515, and R-2524 require prior approval for entry. These internal restricted areas have vertical dimensions of surface to unlimited, except, R-2506 which extends from surface to 6000' MSL (Figure 3-2).

(2) Military Operations Areas. The four main MOA work areas, Isabella, Owens, Saline, and Panamint, along with Barstow, Buckhorn, Bishop, and Shoshone MOAs, have a minimum altitude boundary of 200' AGL; and Bakersfield and Porterville MOAs have a minimum altitude of 2000' AGL (Figure 3-3 and Appendix D). Portions of the four major work areas are located over Sequoia/Kings Canyon National Parks, John Muir and Domeland Wilderness Areas, and Death Valley National Park (See "NOTE" below) where the lower limit of the MOA is 3,000' AGL. MOAs do not include the airspace below 1,500' AGL within three miles of any charted airport; except, Mojave Airport Class D airspace.

NOTE

Exclusion of MOA airspace above the Death Valley National Park and Domeland

R-2508 COMPLEX



(Separate clearances required to overfly or enter internal restricted areas)

NOTE: R2508 takes precedence over ATCAA airspace when active.

Figure 3-1. R-2508 Complex vertical dimensions.

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R-2508 COMPLEX

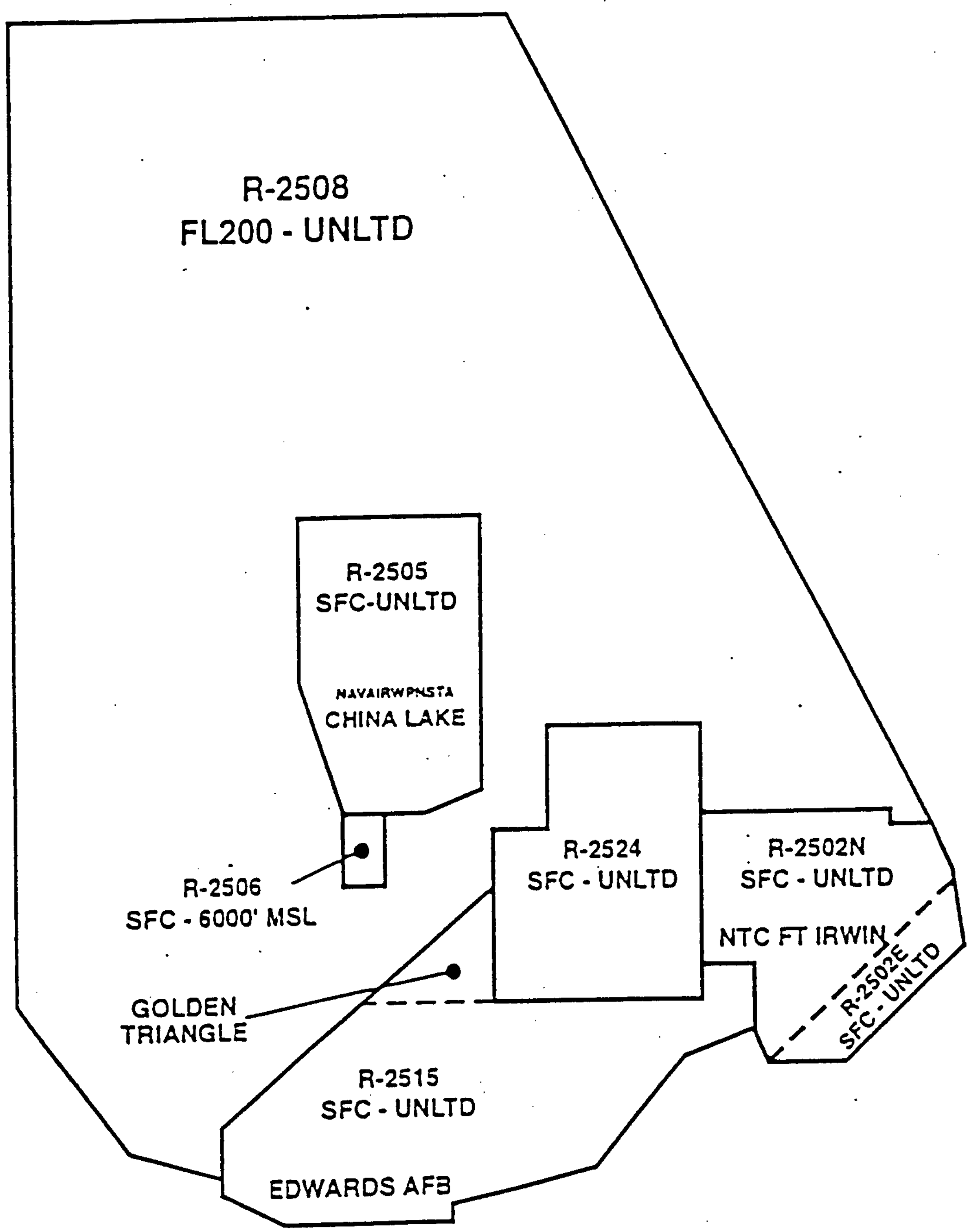

Figure 3-2. Restricted areas vertical dimensions.

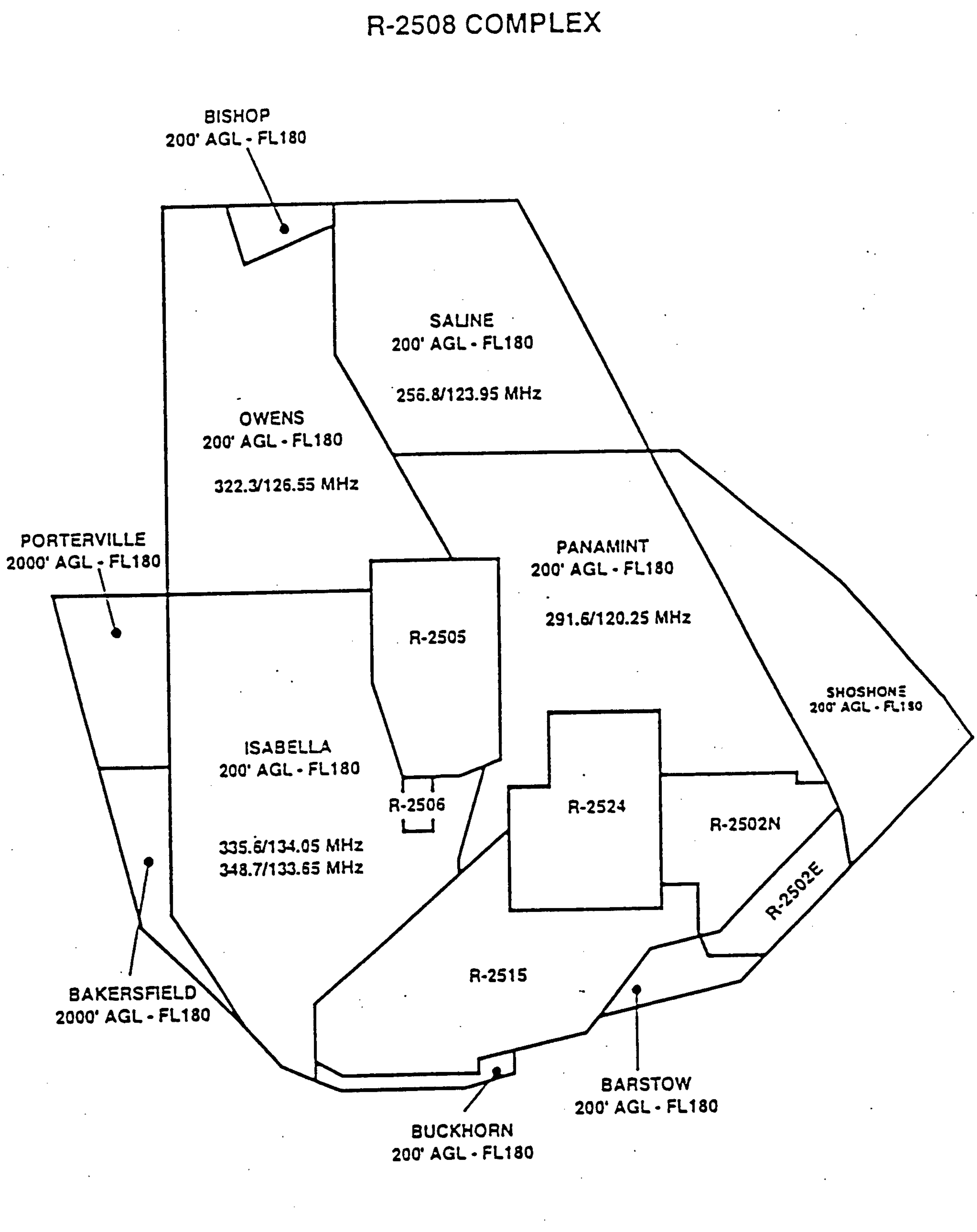

Figure 3-3. Military Operation Areas (MOAs) vertical dimensions.

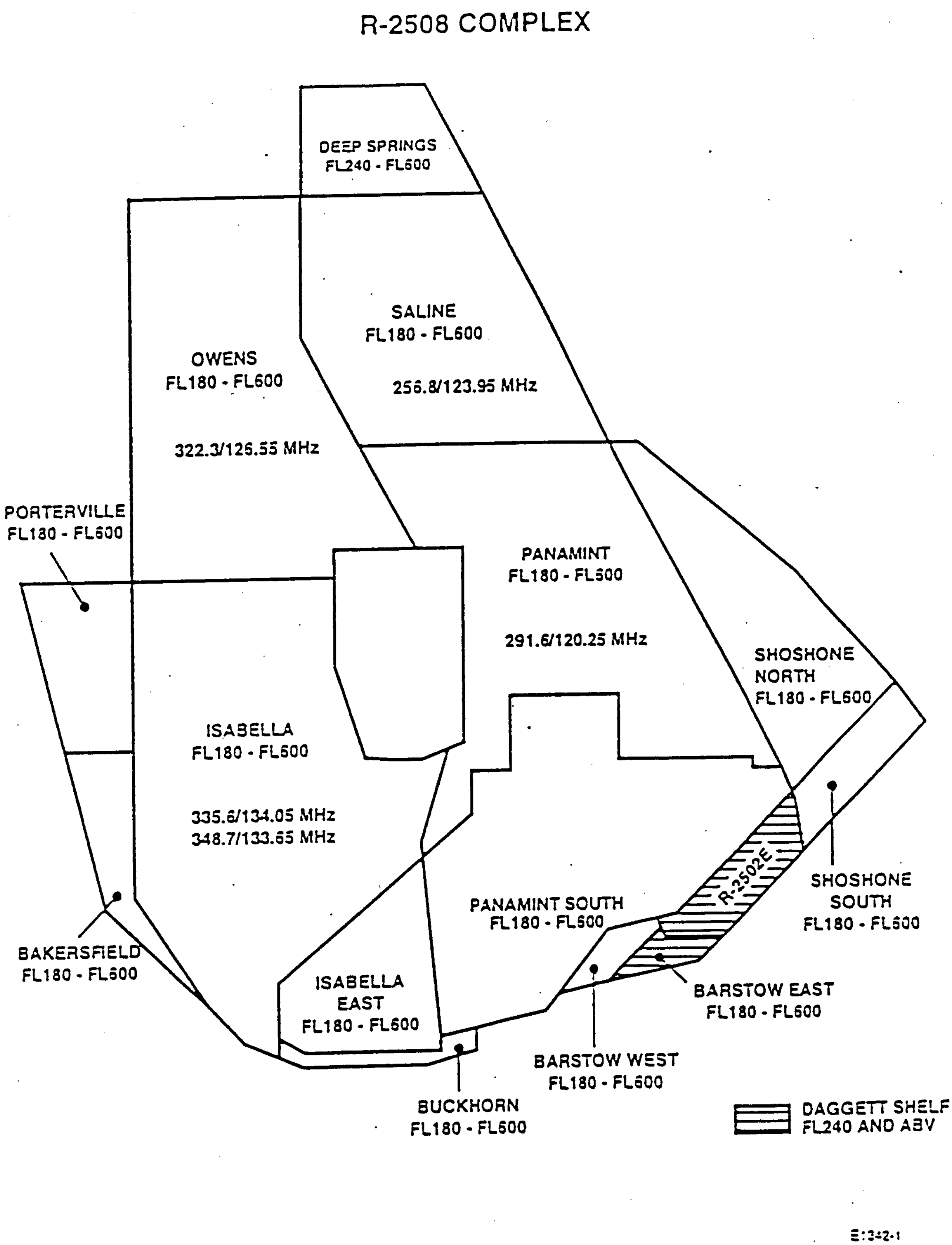

Figure 3-4. Air Traffic Control Assigned Airspace (ATCAAs) vertical dimensions.

Wilderness Area applies to the 1977 contours of the former National Monument and Wilderness Area. This difference in affected airspace may not be accurately reflected in Sectional Charts. Refer to Figure 3-5 and contact CCF if further information is required.

(3) Air Traffic Control Assigned Airspace. The ATCAAs (Figure 3-4 and Appendix D) are used to fill the airspace gap between the top of the MOAs (FL180) and the base of R-2508 (FL200). When R-2508 is not activated, the ATCAAs may extend upward to FL600. ATCAAs are also located above the peripheral MOAs, which are outside the lateral boundaries of R-2508, to afford additional areas up to FL600 for segregation of military operations from IFR traffic. Deep Springs is formed solely of ATCAA airspace from FL240 to FL600. Isabella East and Panamint South ATCAAs, FL180 to FL600, are set up within the boundaries of R-2515, R-2502N, R-2502E, and R-2524 to be used as an air traffic control aid for military operations when the restricted areas have been declared "cold."

CAUTION

The ATCAAs over the R-2508 Complex MOAs Owens, Barstow, and Shoshone have different boundary configurations from the corresponding airspace underneath (Figure 3-3 and 3-4). Aircrews must be aware of these boundary differences to prevent possible spillouts into Los Angeles or Oakland Air Route Traffic Control Center (ARTCC) airspace. Aircrews operating in Barstow or Shoshone must assure they request work areas Barstow East, Barstow West, Shoshone North, or Shoshone South ATCAA airspace in conjunction with the appropriate lower MOA airspace when needed.

d. Daggett Shelf. The Daggett Shelf consists of Barstow East ATCAA, R-2502 East, and that portion of R-2508 which coincides with R-2502E, FL240 and above (Figure 3-1). The Daggett Shelf was established by LOA to provide FAA relief for control of IFR traffic through the DAGGETT/HECTOR corridor. The Daggett Shelf along with Shoshone South ATCAA airspace remains under ARTCC control until TRACON requests and receives control of the airspace. Aircrews scheduled for or requiring one or more of the areas that comprise the Daggett Shelf or Shoshone South ATCAA FL240 or above shall request the area(s) and altitudes from TRACON. Aircrews should expect up to 10 minutes delay for transfer of control of the airspace from Center to TRACON. Aircrews SHALL NOT enter any portion of the Daggett Shelf or Shoshone South until specific notification or clearance has been received from TRACON.

e. R-2515 GOLDEN TRIANGLE.

(1) Definition. That portion of R-2515 which extends north of the westerly extension of R-2524's southern boundary. See Figure 3-2.

(2) Coordinates: Beginning at 35°27'40"N/117°26'03"W
thence direct 35°15'56"N/117°26'03"W
thence direct 35°15'56"N/117°43'41"W
thence to point of beginning

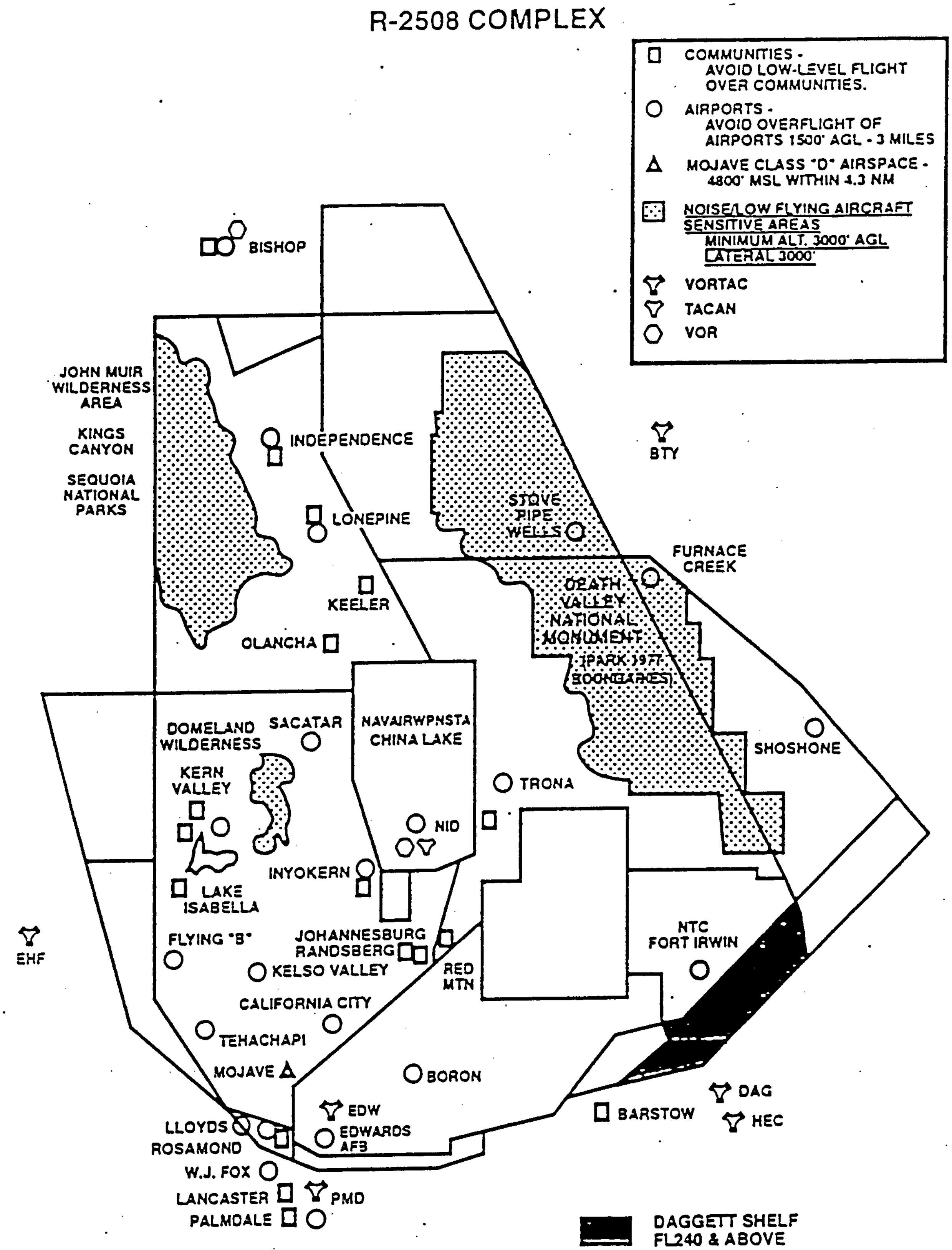

Figure 3-5. Communities, airports, and sensitive areas. A2203-1c

(3) Scheduling. The R-2508 Central Coordinating Facility has been delegated scheduling authority for the Golden Triangle by Edwards AFB. Units requiring this area for transition in/out of R-2524 will schedule the requirement with CCF. CCF will enter GT on the mission's schedule with it appearing on the FAA Flight Progress strip as "GT."

(4) Scheduling/Strip Marking Identifier: GT

(5) Operational Procedures. ASC shall coordinate a radar "Point Out" of aircraft under their control to SPORT or TRACON, if the airspace has been released to TRACON control, prior to entering the Golden Triangle.

f. Released Airspace Status. The internal restricted areas are "owned" by individual military agencies which may be released for joint DOD use. When this occurs, the released airspace becomes part of the basic R-2508 Complex.

3-2. TYPE OF ACTIVITY WITHIN WORK AREAS.

a. Scheduled Complex Activity. Aircraft research and development in all stages of flight from spins to supersonic cruise; operational weapons test and evaluation flights; student training; air combat maneuvering and proficiency flights; and civilian test aircraft in direct support of DOD and/or commercial defense testing are typical operations in the R-2508 Complex, which may support in excess of 350 aircraft sorties on any normal day. Test operations must remain flexible and airspace requirements are not entirely predictable. **Therefore, to best use the available airspace, participating aircraft operating in R-2508 Complex shared use airspace are not segregated. Participating aircraft must accept radar traffic advisories and use the "SEE and AVOID" principle to avoid interfering with the missions of other aircraft.**

(1) Isabella is heavily used by Edwards AFB at all altitudes with rapid maneuvering and ACM conducted over Saltdale/Koehn Lake. Most arrivals and departures from China Lake transit Isabella. Refueling aircraft frequently orbit in Isabella in support of restricted area operations. Additionally, Isabella is a primary holding point for armed aircraft utilizing R-2505 and test aircraft utilizing R-2524. Several Military Training Routes (MTRs) also transit the area (Figure 3-6).

(2) Barstow is used by helicopter and Air Warrior aircraft entering/exiting R-2502N and R-2502E or holding awaiting entering of R-2502N and R-2502E, military traffic on VR1217/VR1218, and Edwards AFB flight test operations. (Figure 3-6).

(3) Buckhorn is used extensively to support Edwards AFB test missions. (Figure 3-1).

(4) Owens is used primarily by Edwards AFB, China Lake, Fresno ANG, and NAS Lemoore for Operational Test and Evaluation (OT&E), Air Combat Maneuvering (ACM), and training flights. Several MTRs also transit Owens. (Figure 3-6).

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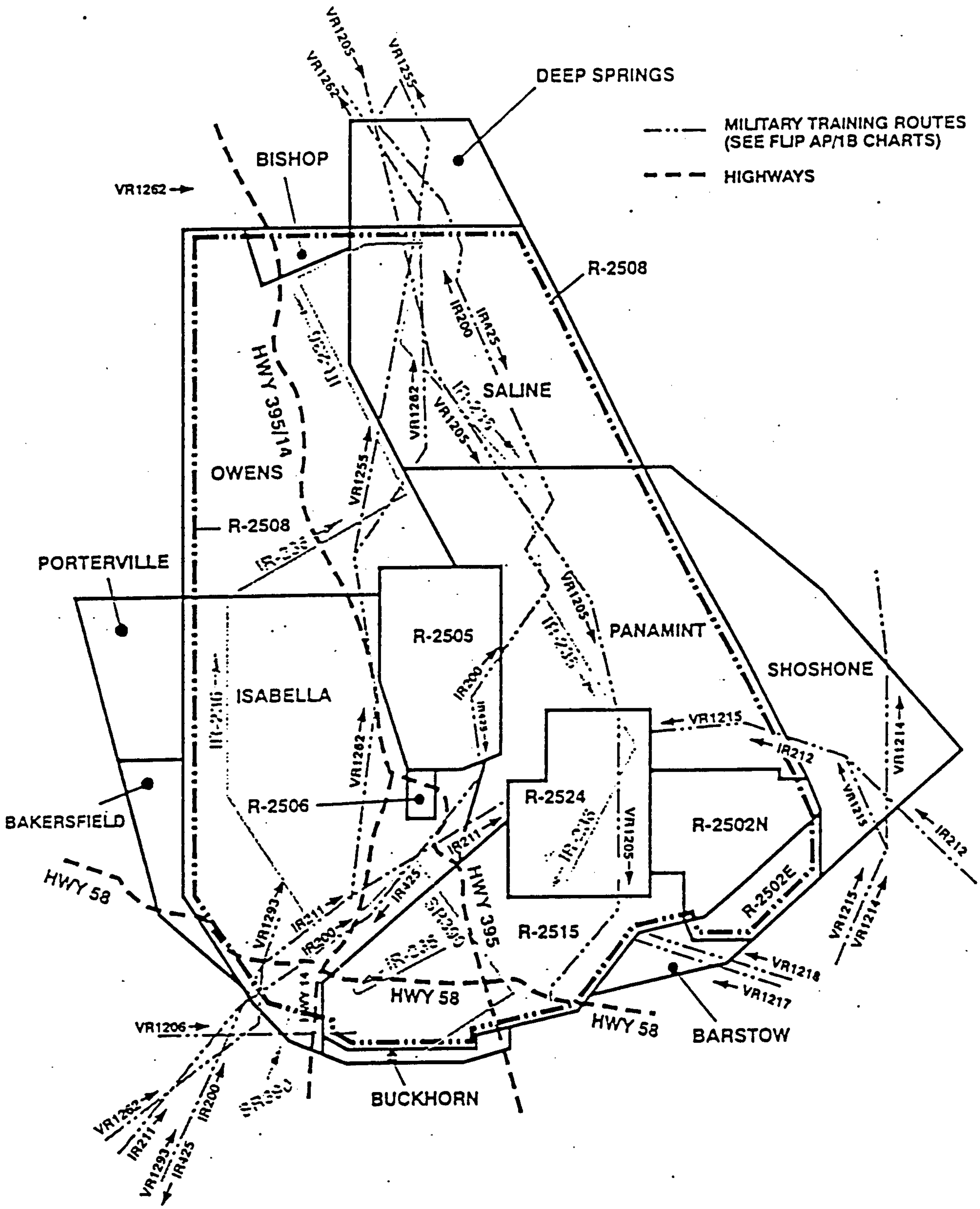

Figure 3-6. Military Training Routes (MTRs), highways and entry points.

(5) Saline is used by aircraft from Edwards AFB, China Lake, Fresno ANG, Nellis AFB, and NAS Lemoore for Test and Evaluation, Air Combat Maneuvering (ACM), and training flights. Saline Valley is used for low altitude refueling activities. Several MTRs also transit Saline. (Figure 3-6).

(6) Panamint is used routinely in support of R-2502N, R-2502E, and R-2524 operations and by Nellis AFB and China Lake units; Fresno ANG and Edwards AFB. Panamint and Shoshone are primarily used for OT&E, ACM, low altitude training, and large scale exercises. Several MTRs transit these areas (Figure 3-6). Shoshone is also used for low altitude tanking operations in support of large scale exercises.

b. Military Low Observable Platforms.

(1) Low observable platforms (i.e., F-117A, B-2A) conduct flight tests throughout the R-2508 Complex. During these missions it is critical these aircraft not be used as targets of opportunity for any ground, airborne, or space based sensors or emitters. If these aircraft are inadvertently tracked by any device, the resulting data is classified and must be afforded proper safeguards. After flight, the incident must be immediately reported to the 412 TG/TSR, DSN 525-8043, or 420 TS/DO, DSN 525-8035 for disposition of data and debriefing instructions.

(2) The discussion of information relating to sensor effectiveness in acquiring, tracking, and targeting these aircraft with anyone other than the person assigned to investigate the incident is not permitted. Failure to comply with this direction may be in violation of Federal and DOD regulations and policy for the protection of classified information as they relate to Special Access Required (SAR) programs.

c. General Aviation. General aviation aircraft fly unrestricted in accordance with Visual Flight Rules (VFR) within the R-2508 Complex MOAs below FL180. Figure 3-7 depicts the most heavily flown routes.

d. Hang glider operations are conducted along the Sierra Nevada Mountain Range and along the northeast shoreline of Owens Dry Lake through the Owens Valley along the Inyo Mountain Range to Bishop, California.

e. Ultralight activity is also popular in many areas throughout the R-2508 Complex MOAs. This activity is primarily concentrated around towns and civil airports within the R-2508 Complex.

f. Sailplane activities are conducted daily from the Tehachapi Mountain Valley, Lone Pine, Independence, Rosamond, Mojave, California City, and Inyokern airports.

NOTE

An annual sailplane Wave Camp, is conducted in the Isabella Work Area usually in early March and lasts for two weeks. During the Wave Camp sailplane operations will be

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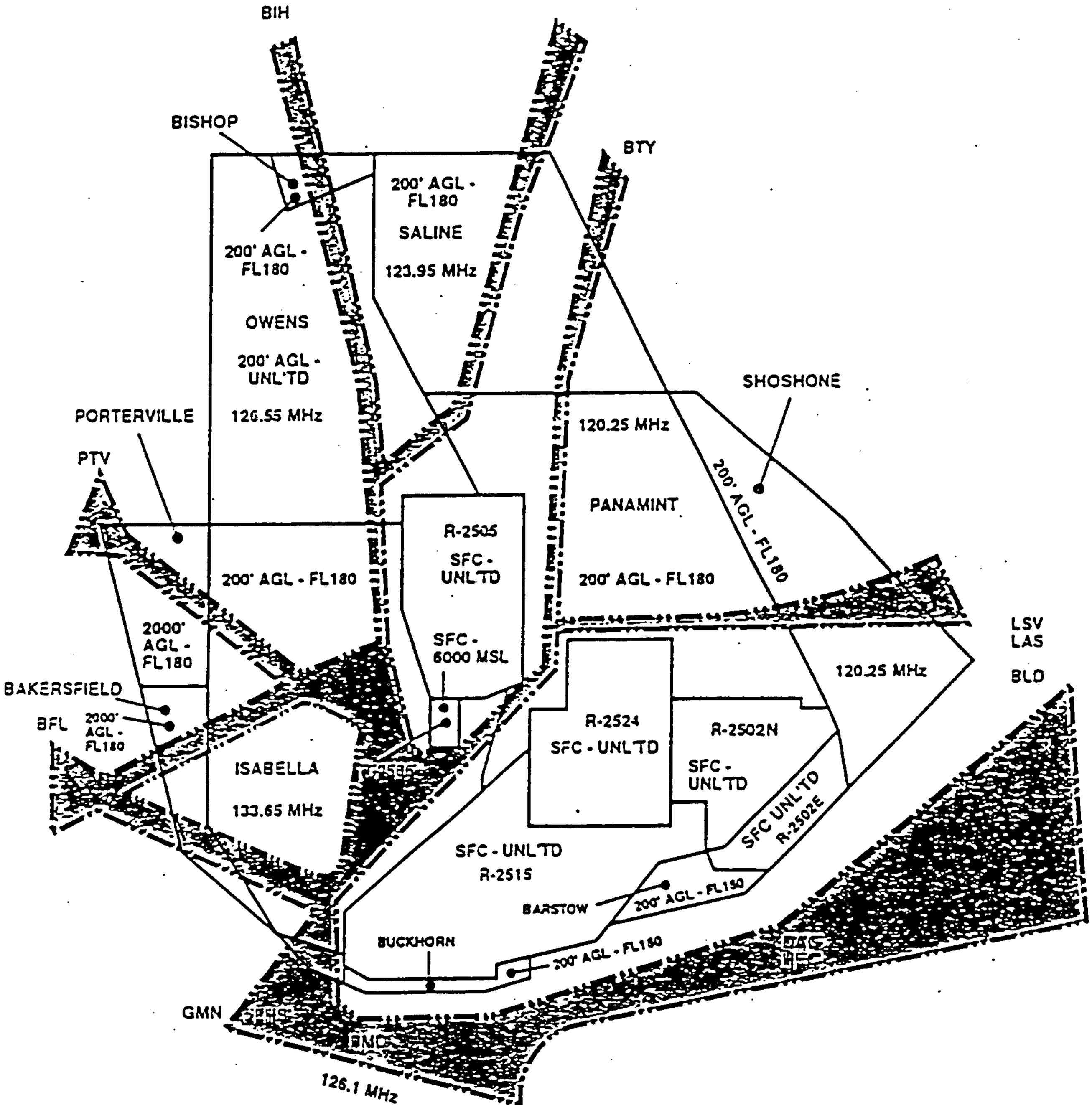

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Figure 3-7. Areas of concentrated general aviation aircraft.

extremely heavy in the area of California City Airport due to launch and recovery of flights and transitioning from airport to/from operating area. The heaviest concentration of sailplane operations is expected along and East of the Sierra Nevada mountain range from Tehachapi Pass to the mouth of Lone Tree Canyon, 13 NM Northeast of Tehachapi Pass. Sailplane operations below FL180 are not confined to Isabella MOA, but remain clear of restricted areas. Sailplane operations FL180-FL500 are restricted to an area bounded by California City Airport, Mojave Airport, Highway 58/Tehachapi Pass, and mouth of Lone Tree Canyon. Coordinates for this area are:

Beginning at 35°09'N/118°01'W (California City Airport)
thence direct 35°03'N/118°09'W (Mojave Airport)
thence direct 35°06'N/118°18'W (Highway 58/Tehachapi Pass)
thence direct 35°14'N/118°05'W (mouth of Lone Tree Canyon)
thence direct to point of beginning.

g. California City Airport is used for parachute activities from surface to 17,500 feet MSL by private parachute clubs and occasionally by military aircraft.

h. Land Management Agency helicopters and fixed wing aircraft operate in the R-2508 Complex, primarily in the western portions of Isabella and Owens. Administrative support aircraft operations are normally 1,500' AGL and below. Actual fire fighting and related support operations will normally be conducted within a Temporary Flight Restriction (FAR 91.137) NOTAM area within a defined area and altitude block. However, aircraft operations to/from staging bases may occur outside of the NOTAMed fire areas.

i. R-2508 Complex entry/exit points for VFR and IFR military activities are depicted on Figure 3-8.

j. Bakersfield and Porterville MOAs/ATCAAs, Deep Springs ATCAA, and Bishop MOA must be scheduled in advance with CCF to ensure accomplishment of required pre-coordination with Los Angeles or Oakland ARTCC.

3-3. SENSITIVE AREAS. The military mission within the R-2508 Complex has long enjoyed the support of the population that lives beneath the R-2508 Complex airspace. This support is essential to DOD's effort to preserve the R-2508 Complex for future military use. Occasional damage from sonic booms and frequent noise complaints relating to low level flight over small towns, airports, and recreation areas have done serious damage to the DOD/civilian community relationship. Aircrews must adhere to Federal Air Regulations (FAR) and DOD rules pertaining to supersonic operations, endangering private property and annoyance to civilians. Areas of concern are as follows:

a. National Parks/Wilderness Areas Altitude Restrictions

(1) A minimum altitude of 3000 feet AGL and lateral distance of 3000 feet (approximately 1/2 nautical mile) shall be maintained over and from the Death Valley National

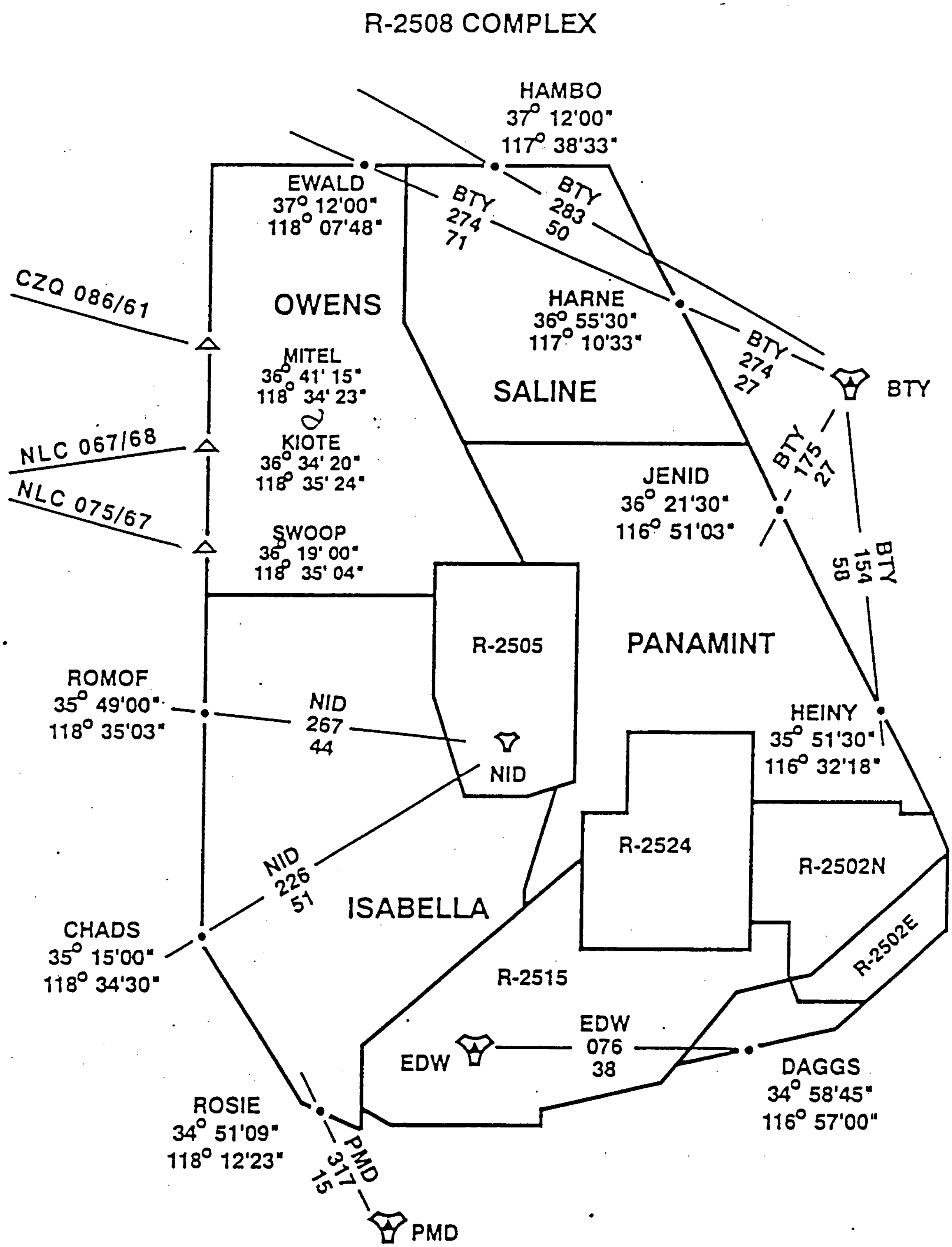

Figure 3-8. R-2508 Complex entry/exit points

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Monument, Sequoia and Kings Canyon National Parks, and the Domeland and John Muir Wilderness Areas as depicted in Figure 3-5. Due to the high visibility and potential impact on DOD, land management agencies and civilian populace relations; aircrews are encouraged to avoid these areas to the maximum extent possible. Missions requiring overflight of these areas should take extra precaution to abide by the overflight altitudes. Exclusion of MOA airspace above Death Valley National Park and Domeland Wilderness Area applies to the 1977 contours of the former National Monument and Wilderness Area. This difference in affected airspace may not be accurately reflected in sectionals. Refer to Figure 3-5, and contact CCF if further questions.

(2) Low flying aircraft over National Parks and Wilderness Areas is an extremely sensitive issue. Strict vigilance is required.

b. Populated Areas Overflight. Aircrews should avoid overflight below 3000 feet AGL over inhabited areas and communities; including, Keeler, Lone Pine, Trona, Inyokern, Independence, Olancha, Tehachapi, Randsburg, Johannesburg, Red Mountain and Ridgecrest Lake Isabella, and Kernville. Recreational use near these communities and along the Kern River is high in the summer months. Aircrews should anticipate increased sensitivity to operations near these areas. Avoid low level overflight of any obviously inhabited area. See Figure 3-5 for a depiction of sensitive areas.

c. Owens Valley. Aircrews should avoid conducting ACM activities over towns, especially in the Owens Valley. Even though the ACM activity may be at legal altitudes the concentration of noise over the valley floor creates a noise nuisance for the civilian populace in the area. The towns of Lone Pine and Independence have become very sensitive to the noise created by military activities in their area, and flight activities should avoid these areas to the maximum extent possible.

d. Paved Roads. Aircrews should avoid low altitude flight directly over paved roads.

e. Other Areas of Concern:

(1) The official duck hunting season runs between October and January during the birds' southern migration. Little Lake is one of the migratory stops and is also home to a private hunting club which organizes commercial hunting activity at that site (35°57'N/117°54'W). Aircrews should be alert for dangers of bird strikes transiting low-level through this area during hunting season.

(2) Extra caution should be used between the months of October through March within plus or minus one hour of sunrise and sunset for increased bird activity within all the MOA's.

(3) A private ostrich farm is operated along Highway 14, approximately halfway between the highway's intersections with Highways 395 and 178 (35°40'00"N/117°51'45"W). The birds are affected by noise and direct overflight.

(4) A gold mining operation at a Randsburg mine (35°21'30"N/117°36'45"W) conducts blasting with a vertical hazard footprint up to 400' AGL. Blasting is scheduled daily between 1400 (L) - 1700 (L).

(5) A gold mining operation located in the Panamint Valley, approximately 7 miles south of Ballarat (36°56'15"N/117°10'05"W), conducts daily blasting between 1130 (L) - 1300 (L). Flyrock hazard to indeterminable altitudes; direct overflight should be avoided during blasting periods.

CHAPTER 4

R-2508 COMPLEX OPERATING PROCEDURES

4-1. GENERAL.

a. Scheduling Agencies. Unlike most special use airspace, the R-2508 Complex is a tri-service operation with several controlling/scheduling agencies. The scheduling process may require users to coordinate and schedule planned activities with more than one agency. Therefore, units planning operations in R-2508 Complex airspace should be prepared to coordinate and schedule through the agency(ies) having scheduling and operational control of the required areas as listed below. Detailed scheduling and operational procedures are contained in this chapter and in Chapter 4.

AREA	*AGENCY*	*HOURS OF OPERATION*	*FUNCTION*	*TELEPHONE*
R-2508/	R-2508 Central	0600-2200 M-F	Scheduling	DSN 527-2508
MOAs/	Coordinating	0700-1500 Sat		805-277-2508
ATCAAs	Facility (CCF)		FAX	DSN 527-4798
				805-277-4798
			Cellular telephone	805-341-3283
			E-Mail: 2508CCF%ccf@mhs.elan.af.mil	
R-2502N/	NTC Fort Irwin	24 Hours a Day	Scheduling	DSN 470-4320/6816
R-2502E		Every Day		619-380-4320/6816
			FAX	DSN 470-5500
				619-380-5500
		0800-1600 M-F	Installation Aviation	DSN 470-4072
			Officer	619-380-4072
			FAX	DSN 470-5500/5584
				619-380-5500/5584
R-2505/	NAWCWPNS	0700-1700 M-Th	Scheduling	DSN 437-6800
R-2506	China Lake	0700-1600 non-		619-939-6800
		civilian payday	FAX	DSN 437-6950
		Fridays		619-939-6950
		0700-1700 M-Th	Test Management	DSN 437-6807
		0700-1600 non-	Office	619-939-6807
		civilian payday	FAX	DSN 437-6950
		Fridays		619-939-6950
		0700-1700 M-Th	Airspace Surveillance	DSN 437-6908/9
		0700-1600 non-	Center (ASC)	619-939-6908/9
		civilian payday	FAX	DSN 437-6927
		Fridays		619-939-6927

R-2515	Edwards AFB	0600-1700 M-F	Scheduling	DSN 527-4110 805-277-4110
			FAX	DSN 527-9785 805-277-9785
		0700-1530 M-F	Airspace Manager	DSN 527-2446 805-277-2446
			FAX	DSN 527-4462/5544 805-277-4462/5544
R-2524	NAWCWPNS China Lake	0630-1630 M-Th	ECR Scheduling	DSN 437-9128 619-939-9128
			FAX	DSN 437-9152 619-939-9152
		0630-1630 M-Th	Test Management Office	DSN 437-9149 619-939-9149

NOTE: Hours of operation may be changed due to personnel shortages or other factors. Notification of changes will be distributed by NOTAM or DOD message.

b. "Lights Out" Operations. "Lights Out" (Night Vision Device, NVD) operations must be contained within the internal restricted areas. R-2505, R-2524, R-2502N, and R-2502E scheduling agencies can authorize "lights out" operations within their designated areas. Units requiring "lights out" operations shall contact the designated internal restricted area scheduling agency, as listed in paragraph 4-1.a., to schedule "lights out" operations. Aircraft position lights shall remain on while transiting to and from the scheduled restricted area but may be turned off when authorized within the internal restricted area (excludes R-2508). Aircrews shall advise the controlling agency when commencing/terminating "lights out" operations. "Lights out" operations pertains only to the internal restricted areas and is not authorized in any other special use airspace. A waiver to FAR 91.209 is unnecessary if the aircraft is operating in a restricted area in compliance with the Using/Scheduling Agency's rules of operation for the internal restricted area.

c. Electronic Counter Measures/Chaff.

(1) Electronic Counter Measures.

Electronic Counter Measures. Electronic Counter Measures (ECM) (JAMMING and/or CHAFF) activities in the R-2508 Complex must be pre-coordinated and approved by the Western Area Frequency Coordinator (WAFC) office, DSN 351-7983 or Commercial (805) 488-1249, or the appropriate Base Spectrum Manager or Air Force Flight Test Center Spectrum Manager, DSN 527-2390 or Commercial (805) 277-2390. These activities must also be identified to the CCF during the scheduling process.

(2) Procedures.

(a) ECM/Chaff. Contact the appropriate Base Spectrum Manager or Air Force Flight Test Center Spectrum Manager [see paragraph 4-1 c. (4)], or the WAFC office and submit unit request to conduct a specific type of ECM/Chaff activity. Request(s) must include: date/time frame/altitude, type aircraft, type ECM/Chaff, and clearance number if known.

(b) The Base Spectrum Manager will coordinate mission requirements with the Western Area Frequency Coordinator (WAFC) at Point Mugu. This will be scheduled by using the airspace name followed by a number designating the type of activity requested (i.e., 1 for Chaff and 2 for ECM).

EXAMPLE: SALINE-1, 21 July, 0800-1000. (Drop specific type of Chaff in Saline MOA from 0800-1000, on 21 July)

(3) Approval. Provided the requested activity is covered by an existing clearance and scheduled with WAFC, the activity is automatically approved. If a conflict is detected, WAFC will notify the coordinating Spectrum Manager of the conflict. Spectrum Manager will notify the requesting unit and take action to resolve the conflict.

(4) Points-of-Contact. Base Spectrum Managers for R-2508 Complex and WAFC agencies are as follows:

(a) Air Force Flight Test Center, Edwards AFB - DSN 527-2390, Commercial (805) 277-2390.

(b) NAWCWPNS, China Lake - DSN 437-6827, Commercial (619) 939-6827.

(c) National Training Center, Fort Irwin - DSN 470-3280, Commercial (619) 380-3280.

(d) Western Area Frequency Coordinator - DSN 351-7983, Commercial (805) 989-7983.

d. Flares. Use of flares in the R-2508 Complex is limited to internal restricted areas (R-2502N, R-2502E, R-2505, R-2515, and R-2524) and is not authorized in R-2508, MOA, or ATCAA airspace. Flare use must be coordinated with the cognizant scheduling agency.

e. Tanker Areas.

(1) There are three unpublished tanker areas established within the R-2508 Complex (Figure 4-1.) These areas are available for use and must be scheduled with the R-2508 Central Coordinating Facility (CCF). Tanker crews and receiver aircraft pilots are reminded,

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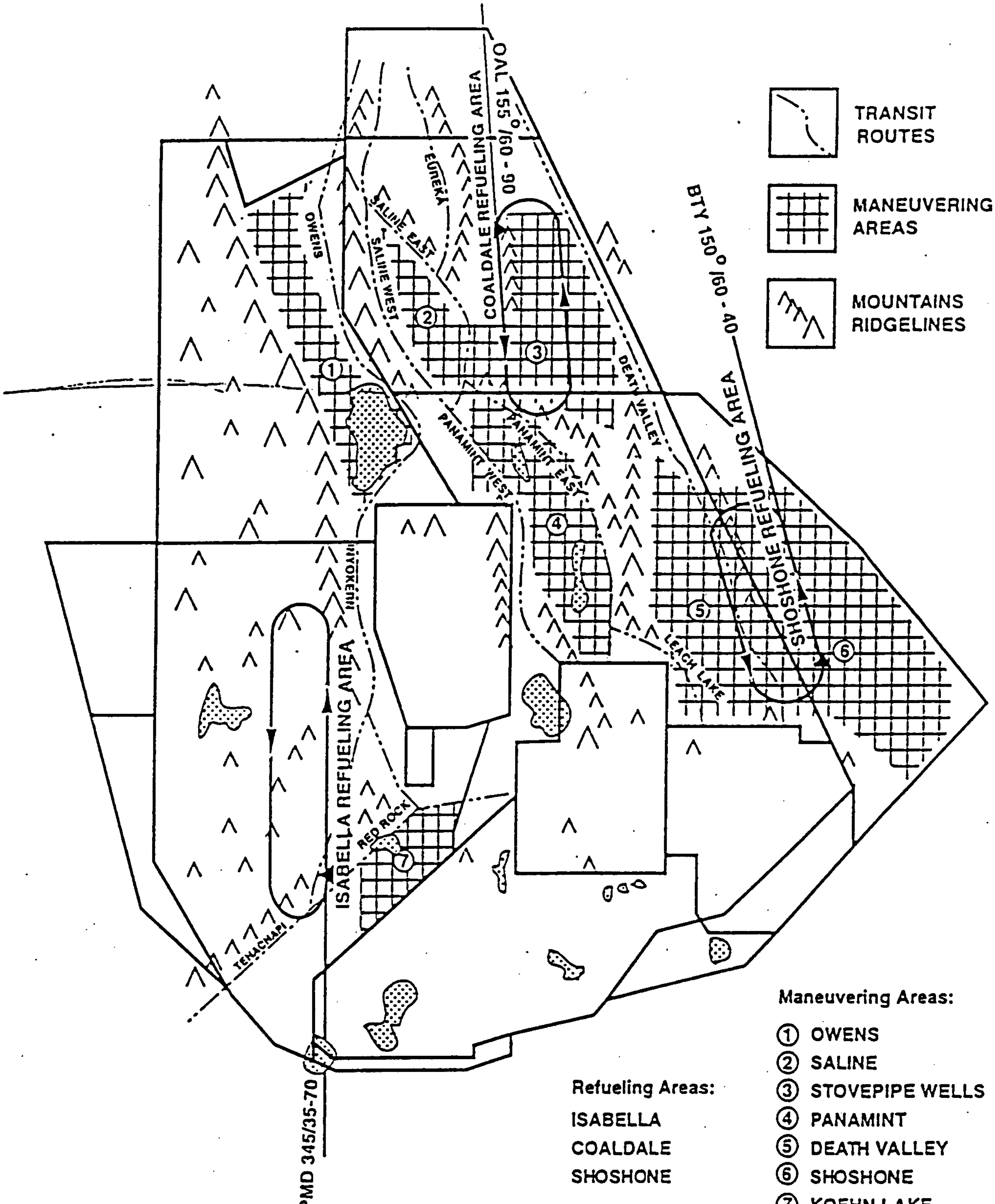


Figure 4-1. Transit routes, refueling areas, and maneuvering areas.

these <u>tanker areas are not exclusive use airspace and are not protected from other Complex aircraft operating in the area</u>. The "See and Avoid" principle applies throughout your tanking operations.

(2) Tanker area definitions are as follows:

	AREA	*ENTRY - NAVAID RAD/DIST*		*LAT/LONG*
(a)	Isabella	Entry	PMD 345/35	35°13'N/118°04'30"W
(b)	Coaldale	Entry	OAL 155/60	37°00'N/117°33'W
	NOTE: DO NOT GO EAST OF OAL 143R.			
(c)	Shoshone	Entry	BTY 150/60	35°50"N/116°26'W

(3) Refueling Area Directions of Flight:

(a) Isabella - Outbound on the PMD 345R, left turns.

(b) Coaldale - Outbound on the OAL 155R, left turns.

(c) Shoshone - Inbound on the BTY 150R, left turns.

(4) Refueling Areas Frequencies. Each of the R-2508 Complex refueling areas has an assigned frequency to be used during refueling operations. The assigned frequency should be used to the extent possible; if impracticable, coordinate mission/tactical frequency to be used with CCF and/or TRACON. CCF personnel will advise units/squadrons of the appropriate frequency during the scheduling/coordination process. The assigned frequencies are as follows:

	AREA	*FREQUENCY*
(a)	Isabella	234.825 MHz
(b)	Coaldale	252.175 MHz
(c)	Shoshone	272.175 MHz

NOTE

No radar coverage available below 10,000 FT MSL for Shoshone and Coaldale refueling areas.

(5) Pilots operating in the vicinity of R-2508 Complex Tanking Areas (Isabella, Coaldale, and Shoshone), should be extra vigilant for tanking aircraft formations. If a tanker formation is observed request pilots avoid the formation by a minimum of 2,000 feet vertically and five miles horizontally. This separation is necessary to preclude the risk of an emergency breakaway/maneuvering on the part of the tanker formation. To ascertain if a tanker area is "active" contact High Desert TRACON (Joshua Approach) and request status.

f. Supersonic Operations. Supersonic flight is not authorized in R-2508, MOAs, or ATCAAs. Supersonic operations may be conducted in internal restricted areas after specific approval from the appropriate scheduling agency. Supersonic flight may be authorized in the R-2515 High Altitude and Black Mountain Supersonic Corridors (Figure 5-5). Supersonic corridors shall be scheduled and approved by the Edwards AFB scheduling office, see paragraph 4-1.a. While real-time airborne coordination may be accomplished during the normal work week, the supersonic corridors will not be available on weekends unless pre-scheduled with the designated scheduling agency prior to close of business on the Friday before intended use. All supersonic flights must be reported as directed by appropriate military service directives (OPNAVINST 3710.7, AFI 13-201).

g. Airborne Radar Unit (ARU) and Airborne Warning and Control System (AWACS) Operations. See Appendix A.

h. Open Skies.

(1) The Open Skies Treaty was ratified by the United States Senate in 1994. Under the terms of this treaty, signatory countries are authorized to operate aircraft over all national territories of the visited country (i.e., United States) under the conditions outlined in the treaty. These conditions permit access to all United States airspace without restriction. Although the treaty has not yet entered into force, the On-Site Inspection Agency (OSIA) is conducting "mock" or training flights under the terms of the treaty. Additionally, the State Department has authorized foreign overflights to be conducted in U.S. airspace in preparation for treaty implementation. These foreign overflights may be conducted from either the U.S. Open Skies platform (OC-135) or the visiting country's aircraft. In all of these pre-treaty flights, all conditions of the Open Skies Treaty, related to access to airspace and notification procedures are being exercised as they would when applied to a treaty authorized Open Skies Aircraft. <u>Treaty provisions state that Open Skies flights take precedence over regular air traffic and allow flights through all Special Use Airspace.</u>

(2) CCF is responsible for notification of proposed Open Skies flights to R-2508 Complex users/agencies. Notifications are to allow users/agencies to take appropriate action in preparation for the proposed flight. Upon receipt of notification of a proposed Open Skies flight, CCF will advise users/agencies of the flights details through a series of messages listed below. Request all users/agencies receiving these messages be prepared to review and modify their flight requirements for R-2508 Complex airspace based on the proposed overflight window. Notice of the actual airspaces and times affected by the Open Skies flight plan will be identified in the messages as details are available.

(a) General Alert. Advises of receipt of notification of the intent of an Open Skies flight to be conducted. Message will be received by the OSIA a minimum of 72 hours prior to the Open Skies flight aircraft arrival at the Point-of Entry (POE).

(b) Initial Alert. The Open Skies initial flight plan has been submitted for approval. This flight plan is submitted a minimum of 24 hours* before the flight departs the POE or if designated, Open Skies airfield (OSA). "*" These timelines are based on notification criteria between the affected parties (OSIA and Open Skies participants) and will likely be decreased by delays for completion of notification process to CCF and transmittal of the information to Complex users.

(c) Final Flight Plan. Approved flight plan for the Open Skies flight, normally received at least 16 hours* before the flight. Message will list R-2508 Complex airspace that will be affected by the Open Skies flight by direct overflight and/or sensor coverage.). "*" These timelines are based on notification criteria between the affected parties (OSIA and Open Skies participants) and will likely be decreased by delays for completion of notification process to CCF and transmittal of the information to Complex users.

(d) Stand Down. Confirms Open Skies flight will not impact R-2508 Complex Airspace. Message would be received instead of the final flight plan message, if appropriate.

(e) Flight Plan Update. Sent when time permits and provides updated flight plan and/ or times. Message will not be received if the Open Skies aircraft flight path or expected time of arrival at R-2508 Complex boundary has not changed or a "Stand Down" message was received. Message will provide short notice revision of times that R-2508 Complex airspace will be affected by the Open Skies flight.

(f) Flight Termination. Notification that Open Skies activities are no longer authorized and the 96 hours window allowed for the flight is closed.

i. R-2508 Situation Report.

(1) The R-2508 Situation Report, Appendix F, provides R-2508 Complex users, controllers, and other interested parties with an informal method to identify and report circumstances or services that enhance or degrade their mission within the R-2508 Complex. This program does not replace the formal reporting procedures such as the Hazardous Air Traffic Report (HATR), Operational Hazard Report (OHR), or Near Mid-Air Collision Report (NMAC); nor does it address situations that will be reported and handled as flight or controller violations. This form should not be used in those situations. The R-2508 Situation Report will provide R-2508 Complex management with informal user feedback and point out the positive aspects or needed changes to operating policies and procedures. Support by R-2508 Complex users is vital for this program to be effective.

(2) The process for submission of this report has been made as simple as possible. After the submitter completes the form they need to enclose any additional information pages on top of the form, fold and staple, and mail through regular mail channels; or FAX all pages to CCF at DSN 527-4798/commercial (805) 277-4798. Postal fees are pre-paid and printed on the back side of the form with the CCF address. Once the report is received by CCF the submitter, if known, will be notified of receipt and advised of disposition. Reports are processed by the CCF for situation analysis and recommendations. The CCB will assign appropriate action for each situation

(3) The information contained in the R-2508 Situation Report Form (AFFTC Form 5824) is for military use only and will be used for the exclusive purpose of improving air operations within the R-2508 Complex.

(4) All users may obtain copies of the R-2508 Situation Report form by contacting the R-2508 Central Coordinating Facility at DSN 527-2508 or Commercial (805) 277-2508. Users are requested to make copies of the form available in areas readily available to air crews, air traffic controllers, airspace managers, and other appropriate personnel.

4-2. SCHEDULING PROCEDURES.

a. CCF Responsibilities. CCF is the designated scheduling authority for the R-2508 Restricted Area, MOAs, and ATCAAs. CCF may also assist users, as necessary, in obtaining airspace within the internal restricted areas. Other responsibilities include coordinating mission requirements of all Complex users to ensure optimum airspace utilization and flight safety. TRACON is NOT AUTHORIZED to schedule or activate unscheduled R-2508 Complex airspace.

b. Airspace Scheduling. When scheduling airspace, it is important to request only the areas and altitudes necessary. Additional altitudes and areas may be requested in flight, if required; contingent upon the status of the airspace (activated for military use or released for joint use). When R-2508 Complex airspace is activated for military use, it will be reserved as scheduled. When airspace is not scheduled, it is released to the FAA for joint use and two hours prior notice is required to reactivate MOA/ATCAA airspace and 15 minutes for restricted areas. FAA will not issue a work area clearance when airspace is released for joint use. Weekend/holiday operations should be scheduled through the CCF during normal CCF operating hours, as published in FLIP. Changes to scheduled activities after that time must be coordinated with the CCF duty person at cellular (805) 341-3283. Changes (area and/or altitude) requiring additional airspace activation must be received at least two hours in advance to activate the airspace. Cancellations may be forwarded directly to TRACON, (805) 277-2023.

c. Aircraft Scheduling.

(1) Individual user flight schedules must be submitted to CCF by 1730 (L), at least one working day prior to actual flight. Weekend flight schedules must be submitted to CCF prior

to 1730 (L) the Friday before the scheduled activity. Late receipt of flight schedules may result in non-availability of any or all required work areas due to release of airspace to FAA for joint use. Submitted schedules must include:

(a) Aircraft call sign

(b) Number and type of aircraft

(c) Departure/arrival airport

(d) Altitudes required

(e) Estimated time of take-off or entry into Complex airspace

(f) Requested and/or approved airspace required. Indicate work areas (MOAs and ATCAAs) and internal restricted areas. Include scheduled times. Aircrews are responsible for confirming approval of internal restricted areas.

(g) Established routes to be used (does not include random cut and paste) which are published in DOD FLIP (IR/VR/SR) or designated and scheduled by local users (i.e., AFFTC "Color" Routes and China Lake NVD Routes). Contact CCF for more information on location, procedures, and scheduling of locally published routes.

(h) Type mission/activity

(i) Estimated duration in the Complex airspace

(j) Mission frequency

(k) Pre-assigned squawks, when applicable

(l) Special Activities

(2) R-2508 Complex scheduling requirements apply to daily routine activities, flight activities involved in special operations, and large scale exercises as discussed in paragraphs 4-4 and 4-5.

(3) ADDITIONS, CHANGES, OR CANCELLATIONS MUST BE RELAYED TO CCF AS SOON AS POSSIBLE. Add-ons, call sign changes, or time slips of plus one half hour before or one and one half hours after proposed time of departure which are not coordinated with CCF are considered UNSCHEDULED events. Notification of cancellations is required to ensure release of airspace to FAA for joint use when the airspace is not required for designated use. Changes to scheduled operations during CCFs non-working hours may be made by contacting CCF at (805) 341-3283.

(4) It is important that aircrews file and use the same call sign as scheduled with CCF. If call sign change occurs in flight, aircrews should advise the controlling agency of scheduled and new call sign on initial contact.

ATTENTION

Call signs provided to the CCF to schedule activities in the R-2508 Complex shall not exceed 7 characters/numbers and shall be the same as filed on a DD-175. Two letter abbreviated call signs such as BH01, for BLOODHOUND 01, will be interpreted and broadcast as "BRAVO HOTEL 01" by ATC. Tactical call signs shall not exceed 7 characters/numbers and shall be a pronounceable word, in accordance with DOD FLIP, General Planning (GP), Flight Plans.

(5) Transitioning Participating Aircraft. Participating aircraft which have filed a flight plan to land at NAWS China Lake or Edwards AFB, but have not scheduled R-2508 Complex work areas, will be allowed to transit R-2508 Complex airspace on a "not to interfere basis" en route to the filed destination. Aircraft will be considered VFR after crossing the R-2508 Complex boundary inbound.

4-3. UNSCHEDULED AIRCRAFT POLICY.

a. Scheduling Requirements. Military units requiring utilization of R-2508 Complex airspace must comply with scheduling requirements established in FAA Order 7610.4 (U.S. Army AR 95-50, U.S. Navy OPNAVINST 3770.2, AFI 13-201), FLIP, and this handbook.

b. Enforced Procedures. The following procedures are enforced for unscheduled aircraft attempting to use R-2508 Complex airspace.

(1) Commanders of units operating in the R-2508 Complex will be notified of unscheduled aircraft from their unit who arrive at the R-2508 Complex. Units failing to comply with scheduling policies may be denied access to the R-2508 Complex.

(2) IFR aircraft may encounter extensive delays when transiting the R-2508 Complex if they are not a participating aircraft, as explained in paragraph 4-7.

4-4. SCHEDULING OF SPECIAL OPERATIONS.

a. Special Operations Definition. Special operations are defined as activities involving one or more of the following:

(1) Aerial Refueling

(2) Anchoring/holding pattern requirements

(3) Air Intercept/ACM activities (6 to 10 aircraft)

(4) GCI Activities

(5) A concentration or continuous flow of aircraft

(6) Escorted UAV or missile flights

(7) ECM (Jamming/Chaff Corridors - Not Self Protection)

(8) ARU/Communications Ship

b. Scheduling Request. Scheduling requests for special operations must be submitted with at least seven working days lead time to allow all necessary coordination/changes to be approved at least 48 hours prior to scheduled operation. Appendixes B and C, Large Scale Exercise Planning Checklist and Standardized Input Format respectively, are designed to be copied and provided to exercise planners as an aid in the development and coordination of exercise requirements.

c. Lead Time. CCF has authority to designate tanker areas, ACM areas, entry/exit routes, etc., and will attempt to coordinate the operation to minimize impact on other Complex users while retaining scenario realism (Figure 4-1). Final approval authority rests with the CCB. Lead times and approval requirements are required to allow other units to be briefed on the operation (times, routes, altitudes, activities, etc.) and to deconflict the proposed operation as much as possible.

4-5. SCHEDULING OF LARGE SCALE EXERCISES.

a. Definition of Large Scale Exercise. Exercises involving multiple day/multiple range coordinated activities, large numbers of participating aircraft (more than 10), long duration (in excess of 2 hours), or is very complex are categorized as "Large Scale." Operation planners may be required to comply with one or more of the procedures.

b. Planning Requirements. All large scale exercises using the R-2508 Complex must coordinate with CCF a minimum of thirty (30) days in advance of intended operations. Depending on complexity, duration, and size of the exercise area, exercise planners should expect to meet one or more of the following conditions as determined by the CCB:

(1) Provide scenario of exercise plan and airspace requirements to CCF by message or FAX. Exercise planners should ensure CCF and TRACON are addressed in the exercise mission/flight planning message. Message traffic should be addressed to:

"2508CCF EDWARDS AFB CA//"
"FAA HIGH DESERT TRACON EDWARDS AFB CA//"

(2) Brief CCB for approval or stipulations for approval.

(3) Advance coordination with FAA (ARTCCs, TRACON), Military Representatives to the FAA, CCF, and/or other special use airspace agencies.

(4) Generation of an operations plan covering detailed operating procedures to which the range agency and CCF will have direct input.

(5) Special frequency management liaison.

(6) Set up a group briefing for all participating aircrews.

c. Points of Contact. Most large scale exercises require the use of airspace/land ranges managed by various members of the JPPB. Planners must formulate the desired exercise plan along with alternative options as early as possible in order to coordinate mission requirements and negotiate exercise approval. Most airspace coordination may be handled through CCF and agencies listed in paragraph 4-1. The following list provides organizations which may require separate or additional liaison.

AGENCY	*TELEPHONE*
Air Force Representative to the FAA Western-Pacific Region	DSN 833-0481 (310) 725-3900
Navy Representative to the FAA Western-Pacific Region	DSN 833-1247 (310) 725-3910
Army Representative to the FAA Western-Pacific Region	DSN 833-1250 (310) 725-3908
Los Angeles ARTCC Military Liaison	DSN 640-1290 (805) 265-8280
Oakland ARTCC Military Liaison	DSN 730-1595 (510) 745-3334
High Desert TRACON	DSN 527-2023 (805) 277-2023
Western Area Frequency Coordinator	DSN 351-7983 (805) 488-1249

d. CCF Coordination. Because of the extensive knowledge and experience in dealing with large scale exercises, the CCF provides sound suggestions regarding placement of tankers, AWACS/E-2, ACM areas, etc. (Figure 4-1). It is highly recommended CCF be used to its fullest capability. Early contact with CCF can prevent major changes to initial plans.

4-6. FLIGHT PLANNING.

a. Flight Plan Filing. Refer to DOD Flight Information Publication (FLIP) for flight plan filing requirements to land at installations located within the R-2508 Complex. All aircrews filing to land or scheduled to operate in the Complex must understand and operate in accordance with the R-2508 Complex concept explained in paragraph 4-7.

b. Flight Plan Procedures. All scheduled operations originating outside the R-2508 Complex shall file in accordance with the following procedures unless the flight will terminate at an installation within the R-2508 Complex. These procedures shall be followed to ensure availability of an IFR clearance when flights are ready to RTB. Failure to comply may result in a delay in the Complex while TRACON attempts to obtain an IFR clearance.

(1) DD Form 175, Military Flight Plan.

(a) IFR - File two IFR legs or flight plans, one to enter and one to depart the R-2508 Complex. To ensure proper flight plan processing for TRACON, flights not intending to land within the R-2508 Complex should file "R-2508" as the destination in the arrival route of flight and the first fix of the return flight plan/leg, Figure 4-2. Aircraft landing or departing an airport within the R-2508 Complex should file the airport as the destination and/or departure point of the flight plan. The fix of intended entry into the R-2508 Complex, and the fix of intended exit from the R-2508 Complex should be a R-2508 entry/exit fix as listed below, and depicted in Figure 3-8. This does not preclude ATC from clearing aircraft to enter or exit at other R-2508 Complex boundary locations.

EXAMPLE: (See Figure 4-2)	for an arrival:	NFL..OAL..EWALD..R-2508
	for a departure:	R-2508..EWALD..OAL..NFL

	DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TO CODE
	8/22/96	TESTOO	F18/P

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	450	NFL	1900	290	OAL..EWALD	R-2508	0+15
	I	450	R-2508	2000	290	EWALD..OAL	NFL	0+15

Figure 4-2

R-2508 Complex Entry/Exit Points

NAME	*RADIAL/DME*	*LATITUDE/LONGITUDE*
-EWALD	BTY 274/071	37°12'00"N/118°07'48"W

NAME	*RADIAL/DME*	*LATITUDE/LONGITUDE*
JENID	BTY 175/027	36°21'30"N/116°51'03"W
HEINY	BTY 154/058	35°51'30"N/116°32'18"W
HAMBO	BTY 283/050	37°12'00"N/117°38'33"W
HARNE	BTY 274/027	36°55'30"N/117°10'33"W
ROSIE	PMD 317/015	34°51'09"N/118°12'23"W
DAGGS	EDW 076/038	34°58'45"N/116°57'00"W
CHADS	EDW 277/47	35°15'00"N/118°34'30"W
ROMOF	NID 267/044	35°49'00"N/118°35'03"W
MITEL	CZQ 086/061	36°41'15"N/118°34'23"W
KIOTE	NLC 062/068	36°34'20"N/118°35'24"W
SWOOP	NLC 075/067	36°19'00"N/118°35'04"W

(b) VFR - Flights may file VFR to the R-2508 Complex boundaries, but must obtain an Work Area clearance from TRACON/SPORT (Figure 3-3) prior to conducting operations in the R-2508 Complex. Advise TRACON/SPORT prior to departing R-2508 Complex airspace.

(2) Flight plan filing does not relieve the aircrew of the responsibility for scheduling appropriate airspace with CCF.

4-7. FLYING PROCEDURES. The R-2508 Complex operational procedures require understanding and familiarity by all Complex users. Due to the Complex's uniqueness, special operating procedures have been established. All users shall be aware of procedures and restrictions as they may have an adverse effect on planned operations. All users of the R-2508 Complex shall comply with the following procedures, unless otherwise coordinated.

a. General.

(1) Users shall be briefed and knowledgeable of R-2508 Complex operating procedures applicable to their mission. COMMANDERS OF UNITS FLYING IN THE R-2508 COMPLEX ARE RESPONSIBLE FOR ENSURING THEIR AIRCREWS ARE PROPERLY BRIEFED. Users include transients to installations located within the R-2508 Complex. CCF shall provide briefings through telephone contact with individual flights or face-to-face briefings for large groups. Civilian aircraft operating under an R-2508 Complex Letter of Agreement (LOA) are required to comply with the operating procedures defined herein, except as modified by the terms of the LOA.

(2) Participating Aircraft. Military aircraft under the command of or sponsored by the Navy, Air Force, or Army members of the JPPB and civilian aircraft under LOA approval of the R-2508 CCB that accept the terms and conditions of the R-2508 Complex briefing.

(3) Non-Participating Aircraft. Military aircraft that cannot comply with the terms of the R-2508 Complex briefing. These aircraft shall be provided IFR services as specified in FAA 7110.65 and FAAO 7610.4 on a non- interference basis. Delays may be expected.

b. Specific Procedures. These operating procedures apply to military aircraft and other authorized flight activities (in accordance with an approved Letter of Agreement) which operate within R-2508, MOAs, ATCAAs, and internal restricted areas as participating aircraft.

(1) All aircraft within R-2508, MOAs or ATCAAs shall operate VFR. If unable to maintain VFR, aircraft shall advise TRACON (call sign "JOSHUA APPROACH"), China Lake Airspace Surveillance Center (ASC) (call sign "CHINA CONTROL") or Edwards AFB Radar Control Facility (call sign "SPORT"/frequency 272.0 MHz/132.75 MHz) and request an amended Work Area clearance from VFR to IFR to reach VFR conditions.

NOTE

The only condition under which a participating aircraft will be issued an IFR clearance to continue operations within the R-2508 Complex, is if the aircraft encounters weather conditions which are below the minimum for flight under VFR, and the aircrew is unable to proceed under VFR. The purpose of an IFR clearance is to position the aircraft in weather conditions which permit VFR, to exit the area to return to base if unable to locate VFR conditions. After re-encountering VFR weather, the aircrew shall be responsible for canceling IFR clearance.

(2) Operate on the concept of "SEE and AVOID." Scheduling or receiving a clearance to operate within the R-2508 Complex does not constitute exclusive use of the area.

(3) Aircraft shall accept traffic advisories from TRACON, CHINA CONTROL, or SPORT (unless otherwise coordinated). Traffic advisories, safety alerts, and boundary calls shall be issued by controllers on a workload permitting basis.

(a) Aircraft operating in support of R-2505, R-2506, or R-2524 operations will normally be provided radar advisory service by CHINA CONTROL.

(b) Aircraft operating in support of R-2515 operations will be provided radar advisory service by SPORT.

NOTE

When no longer under control of SPORT or CHINA CONTROL, aircraft shall be advised to contact TRACON to continue operations within the R-2508 Complex or to exit the R-2508 Complex.

(4) All aircraft operating in the R-2508 Complex are required to have an operational transponder and Mode C unless otherwise coordinated. Aircraft shall remain on the ATC assigned transponder code while operating in the R-2508 Complex unless otherwise directed by ATC. The flight leader for standard formation flights will set his transponder for normal squawk and wingman will squawk standby. Upon break-away into elements or individual flights, the element leader or individual aircrew is required to set transponder in accordance with the following:

(a) Advise TRACON of break-away element's call sign(s), number and type aircraft, and request code assignment.

(b) Advise TRACON if traffic calls are required between elements.

(5) Flights shall maintain two-way radio communications with ATC on the appropriate frequency unless otherwise coordinated. It is desired that intraflight communications be carried out on a secondary radio.

c. Operating Procedures.

(1) All aircraft shall obtain a Work Area clearance prior to operating within the R-2508 Complex.

(a) All flights shall contact TRACON on a Work Area frequency (Figures 3-3 and 3-4) prior to Complex entry and exit. Initial contact shall include a request for a Work Area clearance and altitudes.

(b) TRACON will issue appropriate clearances. THIS WORK AREA CLEARANCE ALLOWS FLIGHTS TO OPERATE VFR IN THE R-2508 COMPLEX. As with any Work Area clearance, aircrews are responsible for remaining within the vertical and lateral confines defined by the clearance. If the aircraft leaves the vertical or lateral confines of the clearance a flight violation may be filed. Aircrews issued Work Area clearance altitudes lower than mission requirements should request higher from TRACON. Some delay may be encountered for higher altitude.

(2) Aircraft shall remain on the assigned <u>LOCAL</u> altimeter while operating in the R-2508 Complex regardless of altitude. Appendix D list facility altimeter to use in specific areas.

(3) Participating aircraft departing the R-2508 Complex shall maintain VFR until crossing the R-2508 Complex boundary.

(4) Flight crews are responsible for obtaining an enroute clearance prior to departing Complex boundaries IFR. If departing VFR, advise TRACON.

(5) TRACON is not responsible for providing IFR separation between participating IFR and VFR traffic operating in the R-2508 Complex.

(6) TRACON shall provide IFR separation between all IFR participants and those non-participating aircraft operating on an IFR clearance.

(7) Active and Inactive Monitoring of Mission Frequencies.

NOTE

Active/Inactive monitoring is dependent upon availability of radio resources at TRACON.

(a) Active Monitoring. TRACON tune transceiver to mission frequency requested, listen on the frequency, and make traffic/boundary calls on mission frequency. Continuous direct pilot to controller communications on mission frequency.

(b) Inactive Monitoring. TRACON tune transceiver to mission frequency requested but do not listen on frequency. Traffic and boundary calls will be made on mission frequency as needed. Direct pilot to controller communications require pilot switch to ATC frequency (i.e., amended clearances, aircrew request, or prior to exiting the R-2508 Complex).

(8) Aircraft not operating on a mission/tactical frequency shall, unless otherwise advised, monitor the appropriate work area ATC discrete frequency (Figures 3-3 and 3-4).

(9) Maneuvering Areas

(a) When using Maneuvering Areas (Figure 4-1) for ACM or any other mission requiring extensive maneuvering, advise TRACON of the area. When conducting ACM, aircrews should be aware of noise sensitive areas that must be avoided to the maximum possible extent, see paragraph 3-3.c.

(b) When transiting Maneuvering Areas en route to work areas or RTB, make every effort to use ridge line transit routes (Figure 4-1) or fly below 5000' AGL to deconflict with possible maneuvering activities.

(10) Low Level Flying

(a) Low level flying activities are conducted at altitudes below the radar horizon and in areas with marginal communications coverage. This reduces the ability of TRACON to provide traffic advisories.

(b) To assist aircrews in avoiding traffic conflicts, a dedicated low level UHF frequency, 315.9 MHz, has been established. The procedures for use of this frequency is similar to UNICOM in concept and allows an aircrew to inform other aircrews of their mission and intentions, and to coordinate/deconflict as necessary. <u>THIS FREQUENCY IS NOT MONITORED BY TRACON.</u>

(c) Procedures. The following procedures have been implemented to enhance flight safety within the R-2508 Complex and should be used by aircrews involved in sustained flight at low altitudes.

1 All aircraft engaged in low level flying should monitor 315.9 MHz when engaged in flight activities below 1500' AGL in the R-2508 Complex work areas.

2 Aircrews shall check in and out on an ATC frequency (Figures 3-3 and 3-4) with TRACON and request to change to the low level frequency. Dual radio aircraft shall continue to monitor appropriate ATC or mission frequency.

3 Calls will be made in the blind using call sign, number and type aircraft, area entering/departing, and direction of flight.

4 Transmissions on the low level frequency are normally confined to:

a Initial check in when entering Panamint, Saline, Owens, and Kern River Valleys; Owens Dry Lake; and Walker Pass.

b Calls necessary to deconflict traffic when two missions are operating in the same area.

c Checking out of an area or from low level flight.

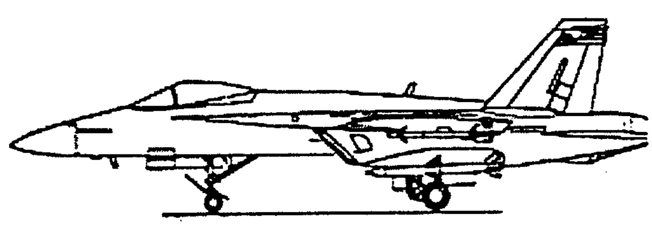
5 In cases where multi-ship flights include aircraft equipped with a single radio, one aircraft should be equipped with multiple radios. This aircraft is responsible for monitoring the low level frequency and providing the necessary coordination to the single radio aircraft in the flight to deconflict the flight's activities with other aircraft operating in the area.

(d) The US Forest Service (USFS) has a communications relay to land management FM, 168.625 MHz, radio equipped support aircraft to monitor the R-2508 Low-Level Frequency, 315.9 MHz, when within communications coverage of the USFS Sherman Peak radio communications site. This arrangement also rebroadcasts land management aircraft transmissions on 315.9 MHz, permitting two-way communications between the military and fire fighting aircraft.

4-8. UNMANNED AERIAL VEHICLE (UAV) OPERATIONS

a. Scheduling Requirements. Guidelines for operating UAVs are contained in Appendix E. Basically, UAVs may be authorized to operate within R-2508 Complex on a case by case basis. Contact the appropriate scheduling agency (see paragraph 4.1) for the affected restricted area(s) where you desire to operate a UAV. Contact the R-2508 Central Coordinating Facility to coordinate operations in the work areas or R-2508.

b. Work Area Clearance. Chase aircraft pilots are required to obtain the appropriate Work Area clearance, and monitor the appropriate ATC frequency for traffic advisories and boundary calls.



R-2508 COMPLEX ENVIRONMENTAL BASELINE STUDY

R-2508 COMPLEX
ENVIRONMENTAL BASELINE STUDY

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Prepared for:

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3.0 ENVIRONMENTAL SETTING OF THE R-2508 COMPLEX

3.1 COMPLEX-WIDE SUMMARY OF ENVIRONMENTAL RESOURCES

This section presents an overview of environmental aspects beneath the R-2508 Complex. Area-specific data are presented in subsequent chapters. Resources presented include land use, socioeconomics, noise, air quality, safety, biological resources, cultural resources, infrastructure, and water resources. For all resources, the term "area" is used to represent the two-dimensional boundary associated with the Restricted Area, Military Operations Area (MOA), and Air Traffic Control Assigned Airspace (ATCAA) three-dimensional airspace.

3.1.1 Land Use

The R-2508 Complex is one of the largest military special-use areas in the United States, covering almost 20,000 square miles. The R-2508 Complex is located primarily in southeastern California and overlies portions of Inyo, Fresno, Tulare, Kern, Los Angeles, San Bernardino, and Mono counties. A small portion, approximately 300 square miles, overlies Esmeralda County, Nevada. The majority of the land that underlies the R-2508 Complex is owned or managed by federal agencies such as the U.S. Air Force; U.S. Army, U.S. Navy; U.S. Department of Agriculture, Forest Service (USFS); U.S. Department of Interior, National Park Service (NPS); and the U.S. Department of Interior, Bureau of Land Management (BLM). There are also State of California, Native American, local government, and private lands under the R-2508 Complex. A summary of land uses in the R-2508 Complex is shown on Figure 3.1.1-1.

The R-2508 Complex airspace is situated over an area with a wide range of ecological types. Many of the natural features beneath the airspace are unique and have been given special protection as part of a national park, national forest, state park, or other designations. Recreational land uses and special management areas are shown in Figures 3.1.1-2 and 3.1.1-3. Because much of the land beneath the R-2508 Complex is protected, the area's permanent population is sparse and development is scattered.

Land use data for the R-2508 Complex is presented in the following subsections: existing regional planning guidelines, military installations, national forests, national parks, BLM Resource Areas, wilderness areas, wild and scenic rivers, national trails system, military reservations, state lands, Native American reservations, city/county lands, private lands, and airports.

3.1.1.1 Existing Regional Planning Guidelines

Several land use planning laws affect federal land management agency administration of the land beneath the R-2508 Complex. These laws include the Federal Land Policy and Management Act (FLPMA) and the California Desert Protection Act. Regional plans affecting land beneath the R-2508 Complex include the California Desert Conservation Area Plan, the West Mojave Land Tenure Adjustment, the West Mojave Coordinated Management Plan, and the Northern and Eastern Mojave Planning Effort.

Federal Land Policy and Management Act. FLPMA (Public Law 94-579) was enacted by Congress in 1976 to direct the management of public lands. Two requirements of the act have had an influence on the management of BLM-administered lands in California. First, the act required that the BLM inventory, study, and review all 17 million acres of public land in California for their wilderness characteristics as described in the Wilderness Act of 1964. Second, approximately 25 million acres of California desert covering portions of Inyo, Kern, Los Angeles, Riverside, and San Diego counties and all of San Bernardino and Imperial counties were designated as the California Desert Conservation Area. FLPMA defines the concept of "Areas of Critical Environmental Concern (ACECs)," as areas within public lands where special management attention are required (U.S. Department of Interior, Bureau of Land Management 1996).

California Desert Protection Act. The California Desert Protection Act was enacted in 1994. The California Desert Protection Act significantly changed the status of over 7 million acres in the California desert. The following is a list of significant changes.

- Death Valley National Monument was enlarged to 3.3 million acres and given national park status. Ninety-five percent of Death Valley National Park was designated as wilderness. All of Death Valley National Park is in the R-2508 Complex.

- Sixty-nine wilderness areas were created on public lands managed by the BLM. Twenty-six of these wildernesses are within the R-2508 Complex.

- Joshua Tree National Monument was enlarged to 794,000 acres and given national park status. Joshua Tree National Park is outside of the R-2508 Complex.

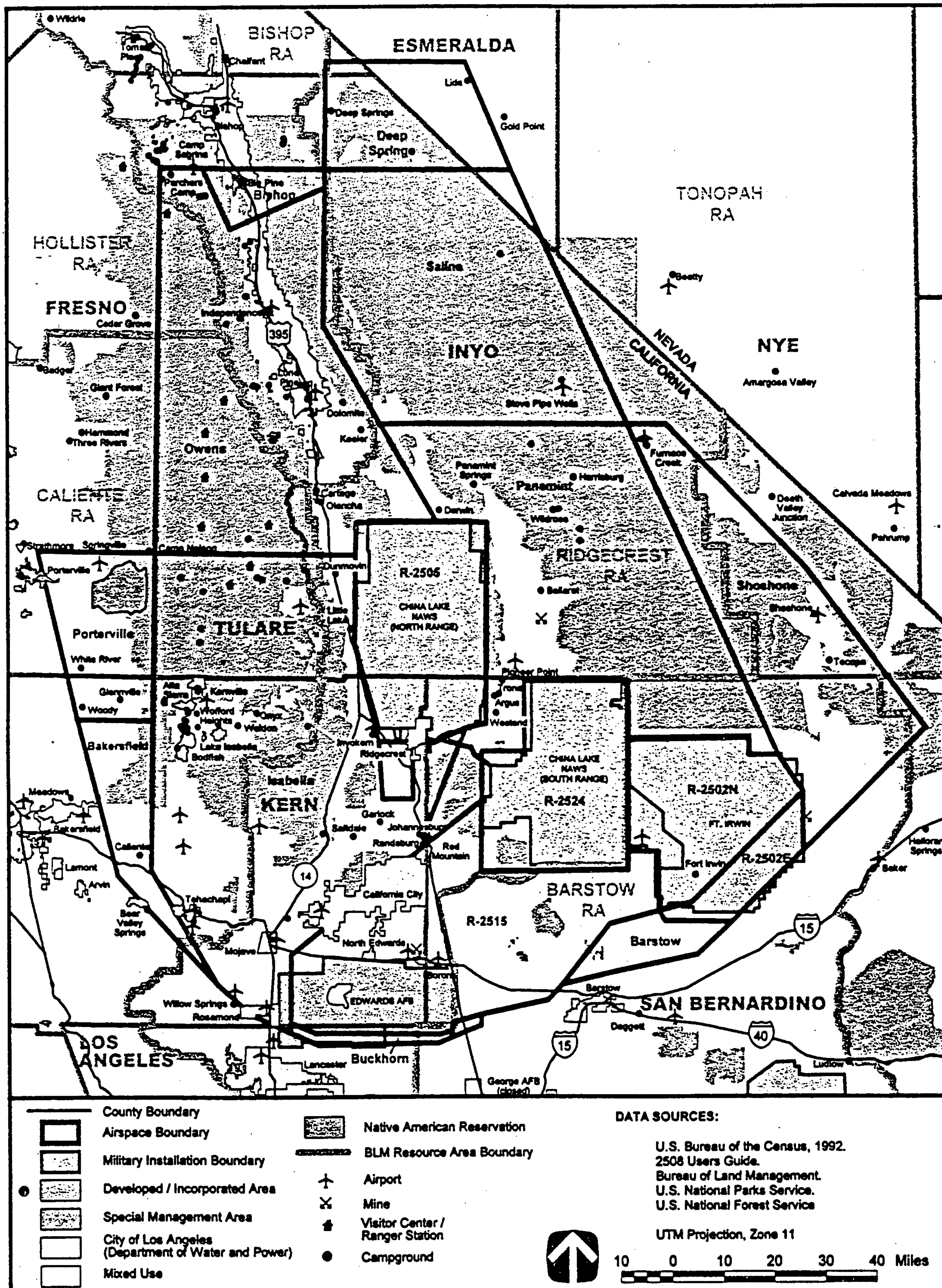

Figure 3.1.1-1 Complex-Wide Summary of Predominant Land Use

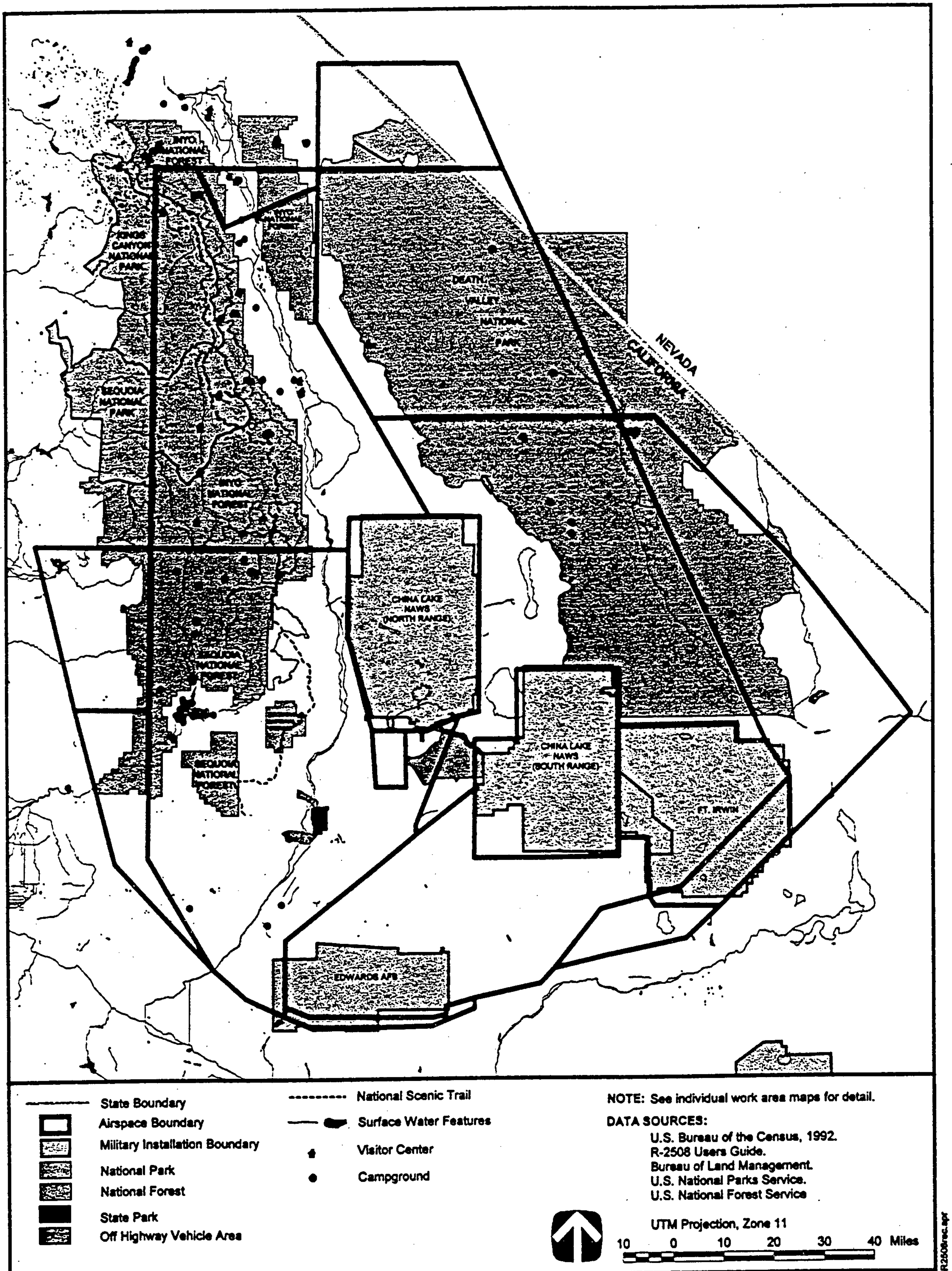

Figure 3.1.1-2 Recreation Land Uses in the R-2508 Complex

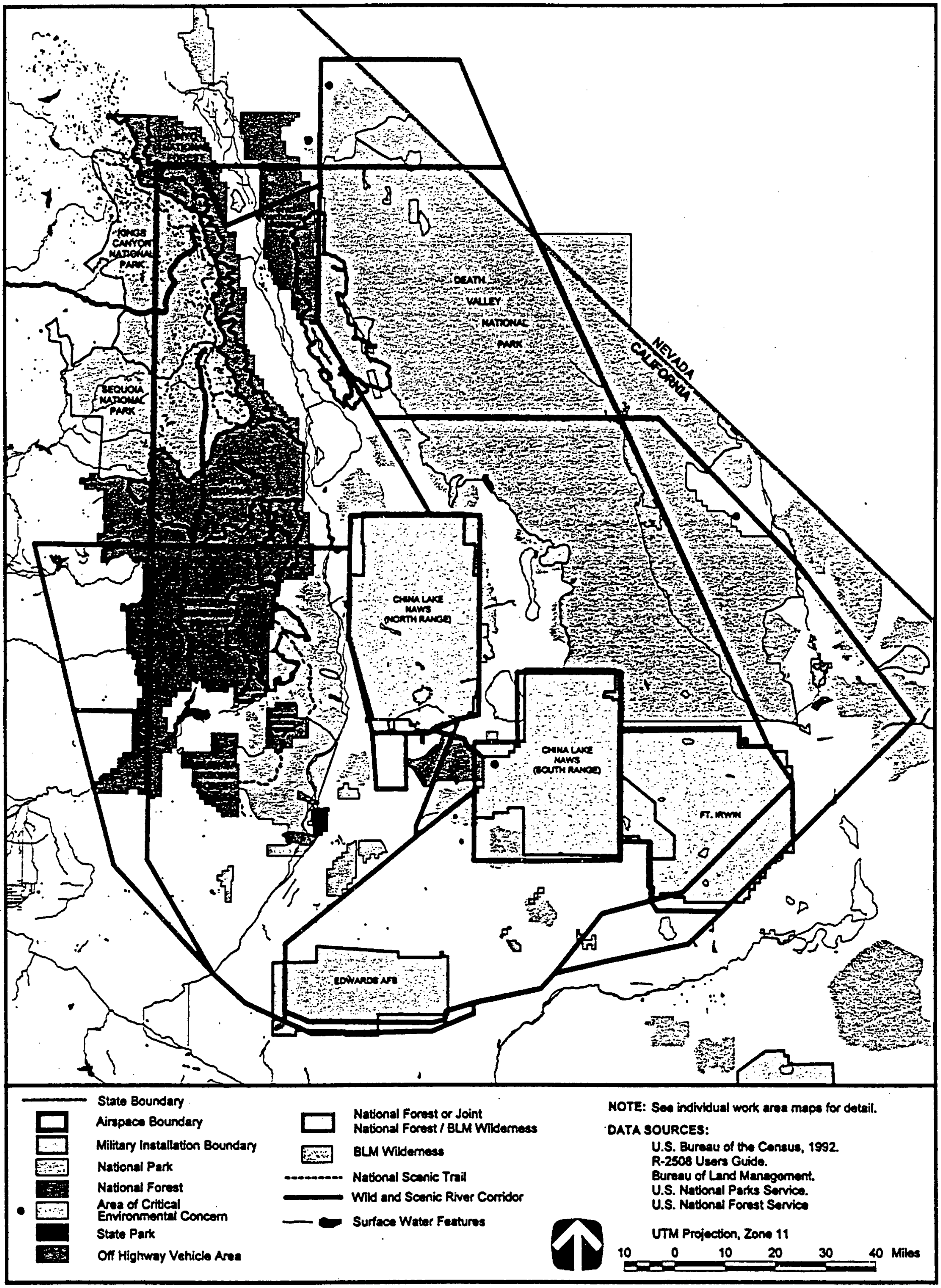

Figure 3.1.1-3 Special Management Areas in the R-2508 Complex

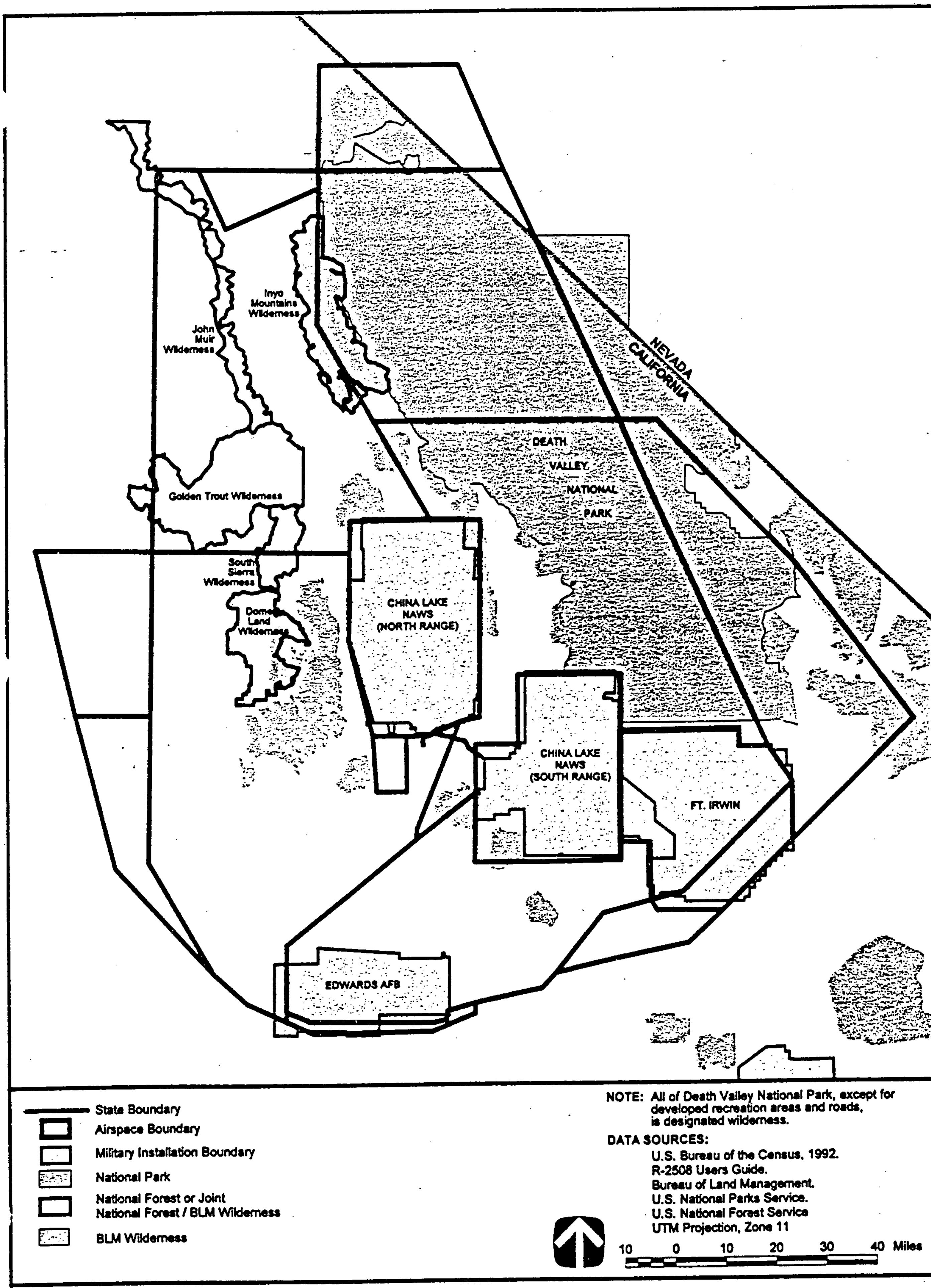

Figure 3.1.1-4 Wilderness Areas in the R-2508 Complex

- The East Mojave National Scenic Area became the Mojave National Preserve, a unit of the national park system. Half of the preserve was designated as wilderness (U.S. Department of Interior, Bureau of Land Management 1977). The Mojave National Preserve is outside the R-2508 Complex.

A discussion of land use restrictions and designations for national parks and wildernesses is provided in Sections 3.1.1.4 and 3.1.1.6, respectively.

California Desert Conservation Area Plan. Section 601 of FLPMA requires the BLM to develop a plan for long-term protection and administration of public lands in the California desert. FLPMA requires this plan, called the California Desert Conservation Area Plan, to take into account multiple use management and sustained yield principles in providing for resource use and development, including maintenance of environmental quality, rights-of-way, and mineral development. The California Desert Conservation Plan was finalized in 1980, and establishes general guidance for management of all BLM-administered lands in the California Desert (U.S. Department of Interior, Bureau of Land Management 1997).

West Mojave Land Tenure Adjustment. Since 1982, amendments to the California Desert Conservation Area Plan have been made annually to clarify site-specific planning decisions. The main goal of the West Mojave Land Tenure Adjustment is to acquire private lands in areas where resource protection should occur and to transfer the property rights of BLM-managed lands to other public land managers or private parties in areas more suitable for future development. The project uses a voluntary exchange program to acquire private land holdings north and west of Barstow and exchange them for public lands south and west of Barstow. The land exchange is based on the value, rather than the size of the property.

West Mojave Coordinated Management Plan. The West Mojave Coordinated Management Plan is a comprehensive, interagency planning effort for the conservation of biological resources in the West Mojave region. In 1992, agencies within the West Mojave planning area established a multi-agency partnership for preparing this plan. The plan is a cooperative effort involving many different agencies:

- Five military installations (Edwards Air Force Base [AFB], Naval Air Weapons Station [NAWS] China Lake, Fort Irwin National Training Center [NTC], Marine Corps Logistics Base in Yermo, and Marine Corps Air Ground Combat Center at Twentynine Palms);

- Four federal land managers (BLM, National Aeronautics and Space Administration at Goldstone, National Biological Service, and Boron Prison);

- Five State of California agencies (the Department of Transportation [Caltrans], the Department of Parks and Recreation, the State Lands Commission, the California Energy Commission, and the University of California Reserve System);

- One special district (Indian Wells Valley Water District);

- Five counties (Inyo, Kern, Los Angeles, Riverside, and San Bernardino); and

- Eleven incorporated towns and cities (Adelanto, Apple Valley, Barstow, California City, Hesperia, Lancaster, Palmdale, Ridgecrest, Twentynine Palms, Victorville, and Yucca Valley).

The West Mojave Coordinated Management Plan evaluates 89 special status species that are known to exist in the planning area. Adoption of the plan will benefit land owners, land developers and users, and land management and regulatory agencies by providing a streamlined permit process; defining consistent mitigation and compensation obligations; reducing the need for project-specific incidental take permits; and reducing the uncertainty related to requirements for long-term species and habitat conservation (U.S. Department of Interior, Bureau of Land Management 1997). As of July 1997, alternatives were being developed and a Draft Environmental Impact Statement (EIS) was scheduled for spring 1998 (Cohen, personal communication, 1997).

Northern and Eastern Mojave Planning Effort. The Northern and Eastern Mojave Planning Effort will provide a regional perspective for the management of federal lands and will update agency-specific management plans to reflect the changes made by the California Desert Protection Act of 1994. The Northern and Eastern Mojave interagency planning team consists of representatives from the NPS, the BLM, and the U.S. Fish and Wildlife Service. Cooperating agencies include the Bureau of Indian Affairs; Fort Irwin NTC; NAWS China Lake; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; California Department of Fish and Game; California State Parks; Caltrans; State Lands Commission; California State Historic Preservation Office; Nevada State Historic Preservation Office; San Bernardino, Inyo, and Mono counties in California; Clark, Nye, and Esmeralda counties in Nevada; and the Timbisha/Shosone, Mojave, and Chemehuevi Native American Tribal Councils. Management plan alternatives and an EIS analyzing these alternatives will be prepared concurrently.

Scoping meetings for this effort were held in May 1997. The schedule as of June 1997 identifies a distribution date for the Final EIS in September 1998 (U.S. Department of Interior, Bureau of Land Management 1997).

3.1.1.2 Military Installations

There are three military installations beneath the R-2508 Complex: Edwards AFB, NAWS China Lake, and Fort Irwin NTC. First established in 1942 as Army Air Base, Muroc Lake, Edwards AFB encompasses 470 square miles of land area in the Antelope Valley portion of the Mojave Desert, about 100 miles northeast of Los Angeles. The primary activity at Edwards AFB is aircraft testing and evaluation (U.S. Air Force 1994b). NAWS China Lake is 1.1 million square miles approximately 120 miles northeast of Los Angeles, adjacent and to the north of the City of Ridgecrest. NAWS China Lake has been operated by the U.S. Navy since 1943 for airborne weapons testing and development (U.S. Navy 1994). Fort Irwin consists of approximately 642,000 acres in San Bernardino County, near Barstow, California. Fort Irwin has been used for antiaircraft, armored, and mechanized training for regular Army and National Guard units since 1940, and was designated as the National Training Center for the Army in 1981 (U.S. Department of Interior, Bureau of Land Management 1996).

Each of these military installations underlies Restricted Area airspace in the R-2508 Complex. Edwards AFB underlies R-2515; NAWS China Lake underlies R-2505 and R-2524, and Fort Irwin NTC underlies R-2502N and R-2502E. A more detailed description of these installations is provided in the land use discussion for these Restricted Areas in Chapter 5.0, 10.0, and 11.0.

A Memorandum of Understanding (MOU) has been signed between the Air Force Flight Test Center (AFFTC) and the BLM, California Desert District, regarding land use decisions on the 2.8 million acres in the R-2508 Complex that are managed by the California Desert Conservation Area Plan (U.S. Air Force 1990). The MOU states the California Desert District has agreed to fully coordinate and obtain recommendations from the AFFTC for the following proposed land uses beneath established airspace areas:

- All development proposals extending greater than 50 feet above ground level (AGL);
- New aboveground utility and communications lines;
- Highly reflective structures or uses;

- Activities that would concentrate human occupations of the areas for more than a temporary period of time defined as groups of greater than 25 persons in a confined area for a period of time more than 14 consecutive days;

- All uses that may release any emissions into the air which would impair visibility or otherwise interfere with operating aircraft (e.g., steam, dust, and smoke);

- Any use that produces electrical emissions which could interfere with aircraft and Air Force communications or navigational aid systems or aircraft navigation equipment;

- Any use that would attract large numbers of birds, such as sanitary landfills and water impoundments; and

- Any proposed increases or changes to existing recreational uses (e.g., off-highway vehicle use, horseback riding, hiking, etc.).

3.1.1.3 National Forests

National forests are managed by the USFS and are used for recreation, preservation, timber harvesting, mining, rangeland, and hydroelectric energy production. Although the heaviest recreational use occurs in the developed areas and major roadway corridors, the most sensitive uses are those in the backcountry and wildernesses. Two national forests, Inyo National Forest and Sequoia National Forest, are in the R-2508 Complex. A summary of annual visitor use of these areas is presented in Section 3.1.2, Socioeconomics.

Inyo National Forest. Inyo National Forest is located in southwest Mono and west Inyo counties. It encompasses approximately 1,200 square miles, of which approximately 1,000 square miles are in the R-2508 Complex in the Bishop and Owens Areas.

Recreation. Recreation is the most significant resource in the Inyo National Forest and is expected to continue in that role in the foreseeable future. The Inyo National Forest has historically ranked within the top five national forests nationwide in terms of total recreational use.

Recreation in the Inyo National Forest can be divided into developed and dispersed recreation. The developed recreation resource includes all public and private recreation facilities on national forest lands. These facilities are oriented toward overnight accommodation, day use, and interpretation. Approximately 98 percent of public and private developed sites are located in concentrated recreation areas, comprising approximately 2 percent of the forest land base. Most concentrated recreation areas are water oriented, paralleling major streams or surrounding major lakes, and located on the eastern slope of the Sierra Nevada Mountains. Table 3.1.1-1 summarizes developed recreation sites in the Inyo National Forest. In general, developed sites are used most heavily in the summer. The exceptions are alpine skiing areas located at Mammoth Mountain and June Lake, which are outside and to the north of the R-2508 Complex.

Table 3.1.1-1

Public and Private Developed Recreation Sites
Inyo National Forest

		Capacity	
Site Type	**Developed Acres**	**Sites**	**PAOT**
Observation Sites	11	5	158
Swimming Areas	26	2	745
Campgrounds (family)	755	69	11,945
Campgrounds (group)	39	14	958
Picnic Grounds	39	12	445
Interpretive Sites	88	20	2,875
Information Sites	10	9	270
Playground Parks	12	1	50
Boating Sites	5	4	150
Motels, Lodgings, Resorts	137	23	3,623
Organization Camps	21	5	560
Concessionaires	102	26	1,500
Recreation Residences	180	27	2,198
Alpine Skiing	4,640	2	22,000
Total:	6,065	219	47,477

Note: PAOT = persons at one time
Source: U.S. Department of Agriculture, Forest Service 1988a

Dispersed recreation includes all recreational activities that occur outside of developed sites such as hiking, fishing, hunting, boating, and off-highway vehicle use. About half of the recreation use in this category takes place near concentrated recreation areas. Like developed recreation site use, dispersed recreation occurs mostly in the summer months. Low recreation use occurs in areas that are not accessible by constructed and maintained public roads. A trend in USFS recreation management is to encourage more dispersed use rather than to construct additional

developed recreation sites. This trend has evolved because developed sites are more costly to maintain (U.S. Department of Agriculture, Forest Service 1988a,c).

Other Land Uses. There are 60 grazing allotments for cattle, sheep, and horses in the Inyo National Forest, covering approximately 1,400 square miles. All suitable rangelands are considered permanent ranges, except for those in suitable timber areas.

Suitable timber stands are found in two general locations in the Inyo National Forest. One area is between Mono Lake and Mammoth Lake and lies outside the boundary of the R-2508 Complex. The second area is near Monache Meadows on the Kern Plateau in the southern part of the Owens Work Area. Approximately 300 square miles of the Inyo National Forest are suitable for timber production. The Inyo National Forest has been supplying lumber and fuelwood to the local area since the 1800s. However, the forest's overall contribution to the lumber industry is relatively small and there are no local sawmills. The average annual timber harvest is 10.5 million board feet.

More than 3,000 mining, mill site, and tunnel site claims are recorded for Inyo National Forest and approximately 40 new mining claims are filed each year. The largest acreage with high and medium mineral potential is found in the Inyo Mountains and the lower elevations of the White Mountains.

Hydroelectric licenses are issued by the Federal Energy Regulatory Commission (FERC). There are four major hydroelectric power projects in the Inyo National Forest; all are outside of the R-2508 Complex boundary. Geothermal leases within Inyo National Forest are outside of the R-2508 Complex boundary (U.S. Department of Agriculture, Forest Service 1988a,c).

A wide variety of activities and facilities are permitted with a special use permit on Inyo National Forest land. These permits allow occupancy and use of national forest land by the private sector and local governments. These land uses are summarized in Table 3.1.1-2.

Schools, community buildings, fire stations, and airports have historically been constructed on Inyo National Forest land under a special use permit. This situation is more pronounced in the Inyo National Forest than on other national forests because so little of the land in Inyo and Mono counties is privately owned. Recent trends have been to transfer lands with community facilities into the private or local government sector.

Table 3.1.1-2

Activities Under Special Use Permit
Inyo National Forest

	Number of Permits	Acres	Miles
Agricultural	26	2,544	2
Community	13	100	0
Industrial	31	906	0
Public Information	3	1	0
Recreation	546	3,980	9
Research	32	16,983	0
Transportation	127	4,818	617
Utilities & Communication	90	3,627	1,250
Water Uses	109	2,001	33
Total:	977	34,960	1,911

Source: U.S. Department of Agriculture, Forest Service 1988a

Sequoia National Forest. Sequoia National Forest is located in west Tulare and west Kern counties. It covers approximately 1,800 square miles, of which 1,400 are in the R-2508 Complex, intersecting Isabella Porterville and Bakersfield Areas.

Recreation. Like the Inyo National Forest, recreation is a significant land use in the Sequoia National Forest. Table 3.1.1-3 summarizes developed recreation facilities in the Sequoia National Forest. Unlike the Inyo National Forest, most of the recreation use (approximately 60%) in the Sequoia National Forest is classified as dispersed recreation. Dispersed recreation uses are not focused in a single location, such as rock hounding, OHV use, sight seeing, hunting, fishing, hiking, horseback riding, and primitive camping. The majority of the dispersed recreation activities occur near roads or trails.

Less than 5 percent of the recreational use in the Sequoia National Forest occurs in the winter months. Most of the recreation use in the winter is associated with Shirley Meadow Ski Area, west of Lake Isabella in the Isabella Area (U.S. Department of Agriculture, Forest Service 1988b,d).

Other Land Uses. Approximately 3 square miles of Sequoia National Forest is authorized for use by the private sector and local governments through special use permits. Permits are for agricultural, industrial, public information, transportation, utilities, communications, and water uses.

Table 3.1.1-3

Public and Private Developed Recreation Sites
Sequoia National Forest

Site Type	Developed Acres	Capacity Sites	Capacity PAOT
Vista/Observation Sites	5	5	157
Swimming Areas	4	2	300
Campgrounds (family)	402	48	5,690
Campgrounds (group)	26	5	430
Picnic Grounds	30	9	530
Resorts	43	6	710
Organization Camps	182	11	1,735
Concessions	18	3	810
Recreation Residences	165	19	1,480
Total:	875	108	11,842

Note: PAOT = persons at one time
Source U.S. Department of Agriculture, Forest Service 1988b

Approximately 270 square miles of Sequoia National Forest, divided into 55 range allotments, is suitable for use by livestock. Sequoia National Forest is important to local ranchers for seasonal grazing in the summer months.

Timber harvesting is an important land use in the Sequoia National Forest. Approximately 660 square miles of land throughout the forest have been classified as tentatively suitable for timber management. There are two major mills utilizing Sequoia National Forest Timber: Sierra Forest Products in Terra Bella, and Sequoia Forest Industries in Dinuba. The average annual harvest is approximately 90 million board feet.

Mining activity in the Sequoia National Forest has been mainly for gold, uranium, and tungsten along the upper and lower Kern Canyon and in the Piute and Greenhorn Mountains.

There are 6 hydroelectric plants with a combined output of 87.6 megawatts currently in operation in the Sequoia National Forests. All are located on the Kern River (U.S. Department of Agriculture, Forest Service 1988b,d).

3.1.1.4 National Parks

National parks are managed by the NPS and exist to preserve unique natural and cultural features. Sequoia, Kings Canyon, and Death Valley National Parks are located within the R-2508 Complex. A summary of annual visitor use is presented in Section 3.1.2, Socioeconomics.

Sequoia and Kings Canyon National Parks. Sequoia and Kings Canyon National Parks cover approximately 1,300 square miles in Fresno and Tulare counties. Approximately 670 square miles of the parks are in the R-2508 Complex, in the Owens Area. Sequoia and Kings Canyon National Parks, which are administered as a single unit, exist to preserve the natural features of the southern Sierra Nevada Mountains, specifically the remaining groves of the giant sequoia (*Sequioadendron giganteum*).

For management purposes, the parks have been separated into four zones: natural, cultural, park development, and special uses (Table 3.1.1-4). Ninety-nine percent of the total land area is designated as the natural zone, which remain largely unaltered by human activity. The cultural zone is established to ensure the preservation, protection, and interpretation of cultural resources.

Table 3.1.1-4

Summary of Management Zoning
Sequoia and Kings Canyon National Parks

Zone	Acres
Natural Zone	862,000
Cultural Zone	500
Park Development	900
Special Uses	500

Source: U.S. Department of Interior, National Park Service 1993

Park development land is managed to provide necessary facilities for park management and visitor services. Table 3.1.1-5 summarizes existing recreation facilities at Sequoia and Kings Canyon National Parks. Visitors to the parks can be separated into day users and overnight users. Day user activities include sightseeing, hiking, and picnicking in the summer, and cross-country skiing in the winter. Overnight users generally stay at one of the campgrounds, cabins, or motel units in the parks, although some backcountry camping does occur. Generally, the majority of the recreational use at the parks occurs in the summer months.

Special use lands are subject to uses by parties not under the daily control of the NPS, usually related to small inholds of private property in the parks (U.S. Department of Interior, National Park Service).

Death Valley National Park. Death Valley National Park covers approximately 5,000 square miles, of which approximately 4,600 square miles are in the R-2508 Complex in the Deep Spring, Saline, Panamint, and Shoshone Areas. The California Desert Protection Act of 1994 redesignated Death Valley from a national monument to a

Table 3.1.1-5

Recreational Facilities
Sequoia and Kings Canyon National Park

Sequoia National Park	Facility
Visitor Centers	2
Campgrounds	7
Picnic Grounds	5
Interpretive Amphitheaters	3
Motels Units	33
Kings Canyon National Park	
Visitor Centers	1
Campgrounds	7
Picnic Grounds	2
Interpretive Amphitheaters	2
Motel Units	50

Source: U.S. Department of Interior, National Park Service 1993

national park, added 1.3 million acres to the park, and designated 94 percent of the park as wilderness. The management plan for Death Valley is currently being updated as part of the Northern and Eastern Mojave Planning effort. The revised plan is scheduled to be completed in September 1998. Death Valley National Park was established to protect geological features and natural and cultural resources in the Mojave and Great Basin deserts of California and Nevada. Recreation uses include camping, picnicking, hiking, and sightseeing. Most visitor use is concentrated in areas around Furnace Creek and Stovepipe Wells.

Death Valley National Park has been characterized into four zones based on existing uses and management: the natural, historic, park development, and special use zones. Over 90 percent of the park is in the natural zone, which encompasses lands managed to protect wilderness values. The historic zone encompasses those lands containing resources listed on or eligible for the National Register of Historic Places. The park development zone encompasses those lands where nonhistoric park development and intensive use substantially alter the natural environment. This zone provides and maintains development that serves the needs of park management and large numbers of visitors. Table 3.1.1-6 summarizes recreational facilities available at Death Valley National Park.

The special use zone encompasses non-federal lands and resource utilization areas. State school board lands comprise the majority of this zone, over 20 square miles. Also included in this zone are 158 valid mining claims and three

Table 3.1.1-6

Recreational Facilities
Death Valley National Park

Facility	Number
Campgrounds	9
Picnic Areas	11
Visitor Centers	2
Ranger Stations	3

Source: U.S. Department of Interior, National Park Service 1990

private recreation areas (Furnace Creek Inn and Ranch Resort, Stovepipe Wells Village, and Panamint Springs). Furnace Creek has a chartered airport with one lighted runway that accommodates private and charter aircraft. Stovepipe Wells Village also has a chartered airport with one landing strip that serves private aircraft. These airports are owned and operated by the NPS (U.S. Department of Interior, National Park Service 1990, 1994a).

3.1.1.5 BLM Resource Areas

BLM lands, located throughout the R-2508 Complex, are managed by six Resource Areas in three districts. In addition to BLM lands, other federal, state, Native American, city, and private lands are located within the Resource Area boundaries. The Tonopah Resource Area is in the Battle Mountain District, Nevada, and covers the extreme northeast corner of the R-2508 Complex. The Ridgecrest, Barstow, and Needles Resource Areas are in the Desert District, California, and cover the remainder of the eastern portion of the R-2508 Complex. The Needles Resource Area only covers a very small portion of the extreme southeast corner of the R-2508 Complex. The Bishop and Caliente Resource Areas are in the Bakersfield District, California, and cover the west portion. There are lands in the R-2508 Complex that are within the boundary of the Hollister Resource Area (also in the Bakersfield District); however, those lands are located within, and managed by, Kings Canyon National Park. The BLM lands are used for recreation, mining, rangeland, timber production, and preservation. Preservation uses include designated wildernesses and ACECs. A summary of annual visitor use is presented in Section 3.1.2, Socioeconomics.

ACEC designations highlight areas where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish and wildlife resources or other natural systems and processes; or to people from natural hazards. FLPMA provides that the designation of ACECs be given priority in the development of land use plans (U.S. Department of Interior, Bureau of Land Management 1991). Table 3.1.1-7 summarizes ACECs in the R-2508 Complex. Wildernesses are federal lands that have been designated by Congress

Table 3.1.1-7

Areas of Critical Environmental Concern in the R-2508 Complex

Name	Acres	Nominating Resource	Location in R-2508
White Mountain (White Mountain City)	832	Cultural Resources (prehistoric) as White Mountain; Cultural Resources (historic) as White Mountain City	Deep Springs Area
Deep Springs Valley (Western Rand Mtns)	16,400	Biological Resources (black toad [*Bufo exsul*] habitat)	Isabella Area
Eureka Dunes (Eureka Valley Dunes)	unk[1]	Biological Resources (dune system) as Eureka Valley Dunes, Recreation (interpretive displays) as Eureka Dunes	Saline Area
Saline Valley (Salt Lake Mesquite /Marsh, Hunter Canyon/Saline Dunes)	unk	Biological Resources (dunes, mesquite, and marsh) as Saline Valley and Salt Lake, Mesquite/Marsh; Cultural Resources (prehistoric and historic) as Hunter Canyon	Saline Area
Cerro Gordo (Cerro Gordo Peak)	9,990	Cultural Resources (prehistoric and historic) as Cerro Gordo; Biological Resources (sensitive plants) as Cerro Gordo Peak	Saline Area
Rose Spring	902	Cultural Resources (prehistoric)	Isabella Area
Fossil Falls (Little Lake)	1,547	Cultural Resources (prehistoric)	Isabella Area
Sand Canyon	2,338	Biological Resources (wildlife habitat)	Isabella Area
Jawbone/Butterbread Area	155,435	Biological Resources (wildlife habitat) as Butterbread and Jawbone Canyons; Cultural Resources (Native American values) as Jawbone Canyon	Isabella Area
Last Chance Canyon	unk	Cultural Resources (prehistoric and historic)	Isabella Area
Desert Tortoise Research Natural Area	15,870	Biological Resources (desert tortoise [*Gopherus agassizii*] habitat)	Isabella Area
Darwin Falls/Canyon	unk	Biological Resources (riparian habitat) as Darwin Falls; Recreation (scenic quality) as Darwin Falls/Canyon	Panamint Area
Surprise Canyon/ West Panamint Canyons/ Panamint City	13,168	Recreation (scenic values/historic resources) as Surprise Canyon/Panamint City; Biological Resources (bighorn sheep habitat) as West Panamint Canyon; Biological Resources (vegetation) as Surprise Canyon; Cultural Resources (historic) as Panamint City	Panamint Area
Inyo Brown Towhee Area/Great Falls Basin	unk	Biological Resources (Inyo brown towhee [*Pipilo fuscus eremophilus*] habitat) as Inyo Brown Towhee Area; Recreation (scenic values) as Great Falls Basin	Panamint Area
Trona Pinnacles	6,360	Recreation (scenic/geologic feature interpretation); Geology (unique calcium carbonate deposits/National Landmark)	Panamint Area
Christmas Canyon	8,540	Cultural Resources (prehistoric)	R-2524
Bedrock Spring	784	Cultural Resources (prehistoric)	Panamint Area
Steam Well	40	Cultural Resources (prehistoric)	R-2515
Squaw Spring	661	Cultural Resources (prehistoric)	R-2515
North Harper Dry Lake	400	Biological Resources (plant species *Eriophyllum mohavensis*)	R-2515
Harper Dry Lake	480	Biological Resources (marsh habitat); Geology (unique lakebed soils)	R-2515
Black Mountain/Inscription and Black Canyon	500	Cultural Resources (Native American values) as Black Mountian Cultural Resources (prehistoric) as Inscription and Black Canyons	R-2515
Rainbow Basin/Owl Canyon	2,158	Cultural Resources (prehistoric) as Owl Canyon; Recreation (geologic resources interpretation) as Rainbow Basin; Geology (unique geologic strucutres/paleontology) as Owl Canyon Trackway	R-2515/Barstow Area
Greenwater Canyon	3,067	Cultural Resources (prehistoric and Native American)	Shoshone Area
Amargosa River/Grimshaw Lake/Amargosa Gorge/China Ranch	unk	Biological Resources (riparian habitat) as Amargosa Gorge/Grimshaw Lake/China Ranch; Recreation (scenic values) as Amargosa River; Geology (unique soils) as Amargosa River	Shoshone Area
Kingston Range	14,452	Biological Resources (bighorn sheep habitat/unique vegetation)	Shoshone Area
Salt Creek (Dumont)/Salt Spring Hills	unk	Biological Resources (riparian habitat) as Salt Creek (Dumont); Cultural Resources (prehistoric) as Salt Spring Hills	Shoshone Area
Denning Spring	416	Cultural Resources (prehistoric and historic)	Panamint Area
Short Canyon	unk	Biological Resources (wildlife habitat)	Isabella Area
Dedeckera Canyon	unk	Biological Resources (unique plant assemblages)	Saline Area
Warm Sulfur Springs	unk	Biological Resources (marsh habitat)	Panamint Area
Crater Mountain	unk	Biological Resources	Bishop Area
Piute Cypress	760	Biological Resources (Piute Cypress *Cupressus nevadeusis*)	Isabella Area
Keynot Peak	2,200	Biological Resources (bristlecone pine forest)	Owens Area
Horse Canyon	1,765	Cultural Resources (prehistoric), Native American values	Isabella Area

[1]unk = unknown

Source: U.S. Department of Interior, Bureau of Land Management 1980, 1985, 1986,1989a.

as part of the National Wilderness Preservation System. Wildernesses in the R-2508 Complex are managed by several different agencies, including the BLM, and are discussed separately.

Tonopah Resource Area. BLM lands in the Tonopah Resource Area that are within the R-2508 Complex are primarily used for cattle grazing. Mining has been a historic use in the area and there is still some ongoing activity. In addition, there are many patented and unpatented mining claims throughout the area. There are no BLM-developed recreation facilities in the Tonopah Resource Area, dispersed recreation has dominated the area.

Recreation activities include hiking, sightseeing, off-highway vehicle (OHV) use, camping, rockhounding, horseback riding, and hunting (U.S. Department of Interior, Bureau of Land Management 1984b,1994b).

Ridgecrest Resource Area. Nearly all of the Ridgecrest Resource Area, except for the northwest and southwest corners, is in the R-2508 Complex. The majority of this area is Death Valley National Park land. There are also some private and State School Board lands within the Resource Area. The BLM lands are primarily used for grazing, mining, designated wilderness area, and recreation. Grazing includes perennial, ephemeral/perennial, and ephemeral allotments for cattle and sheep. Mining has been a historic use throughout the area. Currently, the extraction of sand and gravel comprises most of the mining activity in the Ridgecrest Resource Area. However, there are more extensive mining activities in the Randsburg and Trona areas, and there are numerous patented and unpatented mining claims throughout the area. There are 13 ACECs in the Ridgecrest Resource Area that are in the R-2508 Complex.

Recreational uses in the Ridgecrest Resource Area include hunting and target shooting, camping, sightseeing, rockhounding and hobby prospecting, hiking and backpacking, rock climbing, picnicking, soaking in warm springs, sky-diving and hang gliding, various nature-related activities, and OHV driving. Areas that receive heavy OHV use include the Panamint Dry Lake, (approximately 3 square miles), and Spangler, Dove Springs, and Jawbone Canyon Open Areas. Portions of the Pacific Crest National Scenic Trail run through the Ridgecrest Resource Area. There are also over 100 miles of eligible State Scenic Highways in this Resource Area, including State Route 14, approximately 15 miles; State Route 178, 12 miles; State Route 190, 32 miles; and U.S. Highway 395, 35 miles (U.S. Department of Interior, Bureau of Land Management 1980).

Barstow Resource Area. Portions of the north and northwest areas of the Barstow Resource Area are in the R-2508 Complex. These BLM lands are primarily used for OHV recreation, grazing, mining, designated wilderness recreation, and other forms of recreation. Grazing includes ephemeral and ephemeral/perennial grazing allotments.

Mining has been a historic use throughout the area. Current mining activity is varied, including sand and gravel extraction and the use of geothermal resources (the Tecopa area). There are also eight ACECs set aside to protect and prevent irreparable damage to important prehistoric, historic, Native American, wildlife habitat, geologic and paleontologic resources, and scenic resources.

Recreation uses in the Barstow Resource Area include hunting and target shooting, camping, sightseeing, rockhounding and hobby prospecting, hiking and back packing, hang gliding, various nature-related activities, and OHV driving. Dumont Dunes Off-Highway Vehicle Area receives heavy OHV use. There are also over 30 miles of eligible State Scenic Highways in this Resource Area including U.S. Highway 395, approximately 10 miles; State Route 190, approximately 7 miles; State Route 127, approximately 5 miles; and State Route 178, approximately 12 miles (U.S. Department of Interior, Bureau of Land Management 1980).

Needles Resource Area. Only a very small portion of the Needles Resource Area is within the R-2508 Complex. The majority of the area is covered by a portion of the Kingston Range Wilderness. The remainder of the area is covered by an ephemeral/perennial grazing allotment (U.S. Department of Interior, Bureau of Land Management 1980).

Bishop Resource Area. The southern third of the Bishop Resource Area is in the R-2508 Complex. Approximately 60 percent of this area is Inyo National Forest land. There are also private and State School Board lands within the Resource Area. The BLM lands are primarily used for grazing, mining, designated wilderness area, and recreation. Grazing allotments are mainly seasonal, mostly for cattle and sheep. Mining has been a historic use throughout the area; currently, the extraction of sand, gravel, and volcanic materials. There are also limited areas of potential geothermal development south of Big Pine, east of Lone Pine, and along the southeast side of Owens Lake. The southeast side of Owens Lake has the highest potential. There are also two ACECs.

Recreational uses in the Bishop Resource Area include hunting, camping, fishing, sightseeing, mountain biking, hiking, horseback riding, and OHV use. Concentrated recreation occurs in the Alabama Hills Special Recreation Management Area, west of Lone Pine. Highways with high scenic values include U.S. Highway 396 and State Highway 168 from Big Pine to the Bristlecone Pine Forest (U.S. Department of Interior, Bureau of Land Management 1991).

Caliente Resource Area. The east side of the Caliente Resource Area is in the R-2508 Complex. The land in this area is in the Sequoia National Park, Kings Canyon National Park, Sequoia National Forest, and Inyo National

Forest. There are no BLM Lands within this portion of the Caliente Resource Area. The Lake Isabella survival school is in the Caliente Resource Area.

Hollister Resource Area. The southeast corner of the Hollister Resource Area is in the R-2508 Complex. However, the land within this area is nearly all in the Kings Canyon/Sequoia National Parks, with a very small portion in Sequoia National Forest. There are no BLM lands within this portion of the Hollister Resource Area.

3.1.1.6 Wilderness Areas

The Wilderness Act of 1964 provided for the establishment of a National Wilderness Preservation System with areas to be designated from federally-owned public land within the national forests, national parks, and national wildlife refuges. The goal of the Wilderness Act was to "...secure for the American people of present and future generations the benefit of an enduring resource of wilderness" (U.S. Department of Interior, Bureau of Land Management 1980). Subsequent laws, including the California Wilderness Act of 1984 and the California Desert Protection Act of 1994, have added wilderness designations to the R-2508 Complex area. Land use in the designated wildernesses is undeveloped open space and primitive recreational uses. Wildernesses are managed by the federal agency that owns the property containing the wilderness. In some cases, wildernesses are managed by more than one federal agency. Wildernesses in the R-2508 Complex are managed by the Forest Service and the BLM. There are 30 wildernesses in the R-2508 Complex (Table 3.1.1-8 and Figure 3.1.1-4).

3.1.1.7 Wild and Scenic Rivers

Congress established the National Wild and Scenic Rivers Program in 1968. The Wild and Scenic Rivers Act (16 USC 1271-1287) stated that "the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes" (16 USC 1271). In 1982, the Department of the Interior completed the California component of the nationwide inventory of rivers with potential for wild and scenic status. Four rivers in the R-2508 Complex have been subsequently designated by Congress as Wild and Scenic Rivers: the North Fork Kern River, the South Fork Kern River, the South Fork Kings River, and the Kings River (U.S. Department of Agriculture, Forest Service 1994a,b).

Table 3.1.1-8

Summary of Designated Wildernesses in the R-2508 Complex

R-2508 Subarea/ Wilderness	Total Area (square miles)	Area in R-2508 (square miles)	Area in R-2508 Subarea (square miles)	Nominating Resources	Managing Agencies
R-2515					
Black Mountain	20	20	20	Geological resources	Bureau of Land Management Barstow Resource Area and California Desert District
Golden Valley	60	60	25	Biological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Grass Valley	50	50	10	Biological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Deep Spring Area					
Piper Mountain	113	100	98	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Sylvania Mountains	30	30	30	Biological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Death Valley	5,000	4,600	*	Biological resources, cultural resources, geological resources	National Park Service, Death Valley National Park
Saline Area					
Inyo Mountains	300	300	150	Biological resources, cultural resources	Bureau of Land Management Bishop Resource Area and Ridgecrest Resource Area/USDA Forest Service, Inyo National Forest
Death Valley	5,000	4,600	*	Biological resources, cultural resources, geological resources	National Park Service, Death Valley National Park
Isabella Area					
Dome Land	200	200	60	Biological resources	Bureau of Land Management, Caliente Resource Area and California Desert District/ USDA Forest Service, Sequoia National Forest
El Paso Mountains	40	40	40	Geological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Kiavah	140	140	140	Biological resources	Bureau of Land Management, Caliente Resource Area and Ridgecrest Resource Area/ USDA Forest Service, Sequoia National Forest
South Sierra	100	100	50	Biological resources	USDA Forest Service, Sequoia National Forest and Inyo National Forest
Sacatar Trail	80	80	80	Biological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area, Caliente Resource Area and California Desert District
Bright Star	15	15	15	Biological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Chimney Peak	20	20	20	Biological resources, cultural resources	Bureau of Land Management Caliente Resource Area and California Desert District
Owens Peak	100	100	100	Biological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area, Caliente Resource Area and California Desert District

Table 3.1.1-8, Page 2 of 3

R-2508 Subarea/ Wilderness	Total Area (square miles)	Area in R-2508 (square miles)	Area in R-2508 Subarea (square miles)	Nominating Resources	Managing Agencies
Panamint Area					
Argus Range	120	120	120	Biological resources, geological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Darwin Falls	10	10	10	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Golden Valley	60	60	35	Biological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Malpais Mesa	50	50	20	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Manly Peak	30	30	30	Biological resources, geological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Surprise Canyon	50	50	50	Biological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Death Valley	5,000	4,600	*	Biological resources, cultural resources, geological resources	National Park Service, Death Valley National Park
Shoshone Area					
Funeral Mountains	40	0.5	0.5	Geological resources, biological resources	Bureau of Land Management Barstow Resource Area and California Desert District
Ibex	40	40	40	Geological resources, sensitive plants	Bureau of Land Management Barstow Resource Area and California Desert District
Resting Spring Range	120	5	5	Geological resources, biological resources	Bureau of Land Management Barstow Resource Area and California Desert District
Kingston Range	320	160	160	Biological resources	Bureau of Land Management Barstow Resource Area and California Desert District
Saddle Peak Hills	2	2	2	Geological resources	Bureau of Land Management Barstow Resource Area and California Desert District
South Nopah Range	30	20	20	Geological resources, biological resources	Bureau of Land Management Barstow Resource Area and California Desert District
North Nopah Range	170	15	15	Geological resources, biological resources	Bureau of Land Management Barstow Resource Area and California Desert District
Death Valley	5,000	4,600	*	Biological resources, cultural resources, geological resources	National Park Service, Death Valley National Park

Table 3.1.1-8, Page 3 of 3

R-2508 Subarea/ Wilderness	Total Area (square miles)	Area in R-2508 (square miles)	Area in R-2508 Subarea (square miles)	Nominating Resources	Managing Agencies
Owens Area					
Coso Range	90	90	65	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Dome Land	200	200	140	Biological resources	Bureau of Land Management, Caliente Resource Area and California Desert District/ USDA Forest Service, Sequoia National Forest
Golden Trout	470	450	450	Biological resources	USDA Forest Service, Sequoia National Forest and Inyo National Forest
Inyo Mountains	300	300	150	Biological resources, cultural resources	Bureau of Land Management Bishop Resource Area and Ridgecrest Resource Area/ USDA Forest Service, Inyo National Forest
John Muir	800	150		Biological resources, geological resources	USDA Forest Service, Inyo National Forest
Malpais Mesa	50	50	30	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
South Sierra	100	100	50	Biological resources	USDA Forest Service, Sequoia National Forest and Inyo National Forest
Bishop Area					
Piper Mountain	113	100	2	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
R-2505					
Argus Range	120	120	120	Biological resources, geological resources, cultural resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
Coso Range	90	90	25	Biological resources, geological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District
R-2524					
Grass Valley	50	50	40	Biological resources	Bureau of Land Management Ridgecrest Resource Area and California Desert District

Note: *All of Death Valley National Park, except for developed recreation areas and roads, is designated wilderness.

Source: U.S. Department of Interior, Bureau of Land Management 1994a

North Fork Kern River. The following portions have been designated as a Wild and Scenic River: 78.5 continuous miles, starting from its headwaters in Sequoia National Park, south to the Tulare/Kern county line. The upper 27 miles of the North Fork Kern River is managed by the Parks Service and the remainder is managed by the USFS.

The North Fork of the Kern River originates in Sequoia National Park and flows south through the Kern River Canyon until it empties into Lake Isabella. At the Kern River Ranger Station in Sequoia National Park near the Golden Trout Creek, the North Fork of the Kern River becomes the common boundary between the Inyo National Forest and the Sequoia National Forest (U.S. Department of Agriculture, Forest Service 1988b; 1994a,b).

South Fork Kern River. Congress designated the following portion of the South Fork Kern River as a Wild and Scenic River: 72.5 continuous miles, starting from its headwaters located within the Golden Trout Wilderness, Inyo National Forest, south to the southern boundary of Dome Land Wilderness, Sequoia National Forest. The river is managed by the USFS.

The South Fork Kern River is totally free-flowing and descends through steep gorges with large granitic outcroppings and domes interspersed with open meadows. The river flows through the Golden Trout, South Sierra, and Dome Land wildernesses. The river corridor traverses Monache Meadows, the largest meadow complex in the southern Sierra Nevada Mountains. The river corridor has dramatic diversity in vegetation and riparian habitat. A premium trout fishery exists in the upper reaches of the river. Numerous historic and prehistoric cultural resources sites are known to occur within the corridor (U.S. Department of Agriculture, Forest Service 1988a,b; 1994a,b).

South Fork Kings River. The following portions were designated as a Wild and Scenic River: 40.5 continuous miles from its headwaters in Kings Canyon National Park through Sequoia National Forest to its confluence with the Middle Fork Kings River. The river is managed by the USFS and the NPS.

The headwaters of this river are in Kings Canyon National Park above timberline in a heavily glaciated basin. The river flows through one of the deepest glacial canyons in the nation with several waterfalls and unique geological formations. The South Fork Kings River has a complex floral diversity. The State of California has designated the river as a Wild Trout Stream and important peregrine falcon and golden eagle habitat exist in the river corridor. Numerous prehistoric sites and a significant cultural resource area also exist in the river corridor (U.S. Department of Agriculture, Forest Service 1988b).

Kings River. The following portions were designated as a Wild and Scenic River: 18.0 miles from Pine Flat Reservoir to the confluence of the South Fork Kings River in the Sequoia National Forest. The river is managed by the USFS.

The Kings River forms the boundary between the Sequoia National Forest and the Sierra National Forest. The river is wooded with premium whitewater and is a California State Wild Trout Stream. Numerous cultural resources sites are located in this system, including Native American village sites and the remnants of a large logging flume (U.S. Department of Agriculture, Forest Service 1988b).

3.1.1.8 National Trails System

The National Trails System was created by the National Trails System Act of 1968 (Public Law 90-543). The purpose of the act is to provide for the ever-increasing outdoor recreation needs of expanding population. There were originally three types of trails: scenic, recreation, and connecting trails. In 1978, the act was amended to add National Historic Trail as a category. The trails are managed by a federal land management agency, usually the NPS. No vehicles are allowed on National Trails, including non-motorized bicycles. Equestrian uses are allowed.

There are three designated National Scenic or Recreation Trails in the R-2508 Complex: the Pacific Crest National Scenic Trail, John Muir National Recreation Trail, and Whitney Portal National Recreation Trail.

The Pacific Crest National Scenic Trail was one of the three original trails designated in 1968. The Pacific Crest Trail is approximately 2,350 miles long and extends from the Mexican-California border northward to the Canadian-Washington border. In the R-2508 Complex, the Pacific Crest Trail travels through the Owens and the Isabella Areas.

The John Muir National Recreation Trail is part of the Pacific Crest National Scenic Trail. This trail is approximately 120 miles long and runs north to south in Sequoia and Kings Canyon National Parks in the Owens Area. The trail branches from the Pacific Crest Trail for a short distance in Sequoia National Park and ends at Mount Whitney.

The Whitney Portal National Recreation Trail is a 10-mile trail in Inyo National Forest. The trail begins at Whitney Portal, approximately 13 miles west of Lone Pine, and ends at Mount Whitney (U.S. Department of Interior, National Park Service 1994b).

3.1.1.9 Military Reservations

Military reservations in the R-2508 Complex include Edwards AFB, Fort Irwin NTC, and NAWS China Lake. These facilities are used for a variety of military training and testing purposes. Edwards AFB covers approximately 470 square miles in portions of east Kern, west San Bernardino, and northeast Los Angeles counties and lies beneath R-2515, Isabella Area, and Buckhorn Area. Fort Irwin NTC covers approximately 1,000 square miles in north San Bernardino County and lies beneath R-2502. NAWS China Lake covers approximately 1,700 square miles in southwest Inyo, northeast Kern, and northwest San Bernardino counties and lies beneath R-2505 and R-2524. Further information on air operations related to these installations in the R-2508 Complex can be found in Section 2.2.

3.1.1.10 State Lands

State School Board. Most of the state-owned lands within the R-2508 Complex are State School Board lands. These lands are undeveloped and scattered throughout the area. They are generally comprised of all or a portion of sections 16 and 36 in each township and are administered by the State Lands Commission. These lands are part of the approximately 579,000 acres of the original school lands grant made to California by Congress after its entry into the United States. Net proceeds from mineral interests and sales of these lands have been allocated to the State Teachers Retirement Fund (U.S. Department of Interior, Bureau of Land Management 1996).

State Parks. There are two state parks located within the R-2508 Complex: Red Rock Canyon State Park and Tomo Kahini State Park. Both parks are located in the Isabella Work Area. The total number of visitors to these parks is shown in Section 3.1.2, Socioeconomics, in Table 3.1.2-2.

Red Rock Canyon State Park is located approximately 20 miles north of Mojave. State Highway 14 intersects the park, which covers approximately 40 square miles. The park was designated to preserve the red, brown, and grey sandstone cliffs and other geologic formations as well as biological and cultural resources.

Tomo Kahini State Park is located just northeast of Tehachapi. It currently covers approximately 0.3 square miles. This park has only recently been developed, and additional acreage may be added in the future (C. Matson, personal communication, 1996).

3.1.1.11 Native American Reservations

There are four Native American reservations within the R-2508 Complex. The Big Pine Reservation Nation covers approximately 500 acres and is located on either side of U.S. Highway 395, south and east of the town of Big Pine. The Paiute and Shoshone tribal groups reside on the Big Pine Reservation, which had a 1990 census population of 331. The Lone Pine Reservation Nation covers approximately 500 acres and is located on either side of U.S. Highway 395, south of the town of Lone Pine. Tribal groups on this reservation are also the Paiute and Shoshone, and the 1990 census population was 168. The Fort Independence Reservation Nation covers approximately 700 acres and is located west of U.S. Highway 395, north of the town of Independence. The Paiute tribal group resides on this reservation, which had a 1990 census population of 116. The Tule River Reservation Nation is the largest in the R-2508 Complex. Its trust acreage is approximately 111,000 acres and it is located approximately 8 miles east of Porterville. The Yukuts tribal group resides on this reservation, which had a 1990 census population of 612 (Snyder 1995).

There is also a 40-acre Timbisha Western Shoshone village site at Furnace Creek in Death Valley National Park. A study is being conducted to identify suitable land outside the Park boundary for trust (reservation) status for economic development or subsistence use. However, it is anticipated that the core of the tribe would still reside at Furnace Creek (Green, personal communication, 1996).

3.1.1.12 City/County Lands

The majority of the R-2508 Complex is sparsely developed with most of the cities and towns located in the Lake Isabella area and along the corridors of U.S. Highway 395, and State Highways 14 and 58. Communities located in the R-2508 Complex range in population from several with less than 50 people to Ridgecrest, adjacent to NAWS China Lake, with approximately 27,725. California City, north of Edwards AFB, geographically is the third largest incorporated city in California with an area of 187 square miles, although its 1990 census population was only 5,955 (California City 1993).

The City of Los Angeles Department of Water and Power (LADWP) is a major landholder in the eastern Sierra. The LADWP controls much of the Owens Valley floor for utility easements (County of Los Angeles Department of Water and Power 1995; Urban, personal communication, 1996).

3.1.1.13 Private Lands

Private lands make up a small portion of the R-2508 Complex. Although parcels are scattered throughout the area, the greatest concentrations of private land occur in the southwest portion of the R-2508 Complex, roughly from Porterville to Edwards AFB; southwest of NAWS China Lake; and in the Owens Valley. The predominate private land uses include residential, agricultural (mostly ranching), and mining.

3.1.1.14 Airports

Charted Public-Use Airports. There are 14 charted public airports within the R-2508 Complex. Six of these airports are located in Inyo County; they include the Independence, Lone Pine, Shoshone, and Trona airports. Two others located in Inyo County, Death Valley (Furnace Creek) and Stovepipe Wells, are located in Death Valley National Park and owned and operated by the U.S. Department of Interior. These airports have been discussed in the Death Valley National Park section. The Independence Airport has three runways and is located just north of the Town of Independence, on the east side of U.S. Highway 395. The Lone Pine Airport has two runways and is located between the Township of Lone Pine and State Route 136, just east of U.S. Highway 395. The Shoshone Airport has one runway and is located south of the Town of Shoshone, on the east side of State Highway 127. The Trona Airport has one runway and is located approximately 4 miles northeast of Trona, east of State Highway 178 (Trona-Wildrose Road). The Trona Airport is currently operated by the San Bernardino County Department of Airports (Inyo County 1994). Chapter 2.0 provides detailed information on these airports and their users.

There are seven charted public airports within the R-2508 Complex in Kern County, including California City Municipal Airport, Inyokern Airport, Kern Valley Airport, Mojave Airport, Mountain Valley, Rosamond Skypark, and Tehachapi Municipal Airport. The California City Airport has one runway and is located approximately 1 mile northeast of the California City central business district. The Inyokern Airport has three runways and is located northwest of the Town of Inyokern, in the triangle formed by U.S. Highway 395 and State Highways 14 and 178. The Kern Valley Airport has one runway and is located to the northeast of Lake Isabella, approximately 3 miles south of the Town of Kernville. The Mountain Valley Airport (formerly Fantasy Haven) has two parallel runways and is located 2 miles south of the City of Tehachapi. The Mojave Airport has three runways and is located east of the Town of Mojave, north and east of State Route 58 and south and east of State Route 14. The Tehachapi Municipal Airport has one runway and is located between the City of Tehachapi and State Route 58. The Rosamond Skypark Airport has one runway, is located in northwest Rosamond and is associated with a residential subdivision that has taxiways which connect the airfield with individual homeowner's hangers (Kern County 1994).

There is one charted public airport within the R-2508 Complex in San Bernardino County. The Boron Airport has three runways and is located east of the Town of Boron and north of State Route 58. There are also a number of inactive airfields throughout the R-2508 Complex.

Charted Private Airports. There are nine charted private airports within the R-2508 Complex, including Borax, Coyote Flats, Flying "S", Goldstone, Lloyds, Kelso Valley, River Island, Sacatar Meadows, and Shadow Mountain. Borax is located west of the Town of Boron and north of State Route 58. Coyote Flats is located in Inyo National Forest, west of the Town of Big Pine, near the north boundary of the Owens Area. Flying "S" and Shadow Mountain are located in Sequoia National Forest, west of Bakersfield. Goldstone is located on the west side of Fort Irwin. Lloyds is located northwest of Rosamond. Kelso Valley is located east of the Shadow Mountain airport. River Island is located northeast of Porterville. Sacatar Meadows is located west of NAWS China Lake.

There is also an uncharted airstrip located near Panamint Springs, south of State Route 190. The Panamint Springs airstrip has one runway and is used occasionally by the Inyo County Sheriff's office. There are numerous other private airfields throughout the R-2508 Complex that are not charted for which information was not available. However, use at these airfields is limited.

3.1.2 Socioeconomics

3.1.2.1 Population

Population characteristics for the area under the R-2508 Complex was evaluated using census data. Population density was calculated for census block groups to obtain a complex-wide summary of socioeconomic data. Census block groups are clusters of blocks within the same census tracts that contain between 250 and 550 housing units.

The population in areas underneath the R-2508 Complex is sparse. According to the most recent census data, the majority of the census block groups underneath R-2508 have a population density of less than three persons per square mile. The total 1990 census population for all census block groups that intersect the R-2508 boundary is 160,610. Of this population, 134,751 (84%) are identified as white; 7,875 (5%) are identified as black; 3,715 (2%) are identified as American Indian, Eskimo, or Aleut; 3,800 (2%) are identified as Asian or Pacific Islander; and 10,469 (7%) are identified as other races. Hispanic is not considered a race by the U.S. Bureau of the Census, it is considered a place of origin. Therefore, people who consider themselves of hispanic origin are also included in one

3.1.3.2 Noise Complaint Process for the R-2508 Complex

Each installation that uses the complex: AFFTC, China Lake NAWS, and Fort Irwin NTC, receive noise complaints on a periodic basis from local citizens. Each installation has a Public Affairs Office that responds to these complaints. Complaints are also compiled by the Central Coordinating Facility (CCF) and reported to the Complex Control Board (CCB). The complaints are grouped into three categories: low level, noise, and sonic booms. After investigation, the complaints are further classified as follows:

- **Deviation (Probable)** - Verified, identified violation of the 3000 foot AGL altitude restriction.
- **Unverified**- No verifiable data available consistent with complaint report. Presumed violation due to lack of deniable argument.
- **No Deviation (Questionable)** - Verified, observed (RADAR) and identified aircraft above 3000 foot AGL restriction, at the complaint location at the time of the complaint or within a reasonable time frame.

Most of the complaints are made by park rangers concerning low level flights within the National Parks located within the R-2508 Complex. Complaint data for the time period of January 1995 to September 1995 shows a total of 110 complaints compiled by the CCF. The breakdown of these complaints, according to the classification system, is shown in Table 3.1.3-3. Figure 3.1.3-3 shows the locations of these complaints in the R-2508 Complex.

Table 3.1.3-3

R-2508 Complaint Data for 1995

Type	Deviation	No-Deviation	Unverified
Low Level	24	23	27
Noise	3	3	3
Sonic Boom	24	2	4
Total:	51	28	34

Note: Low level flights are generally defined as flights which are perceived by the complainant to violate the complex recommended flight restrictions over parks, wilderness areas, and communities.

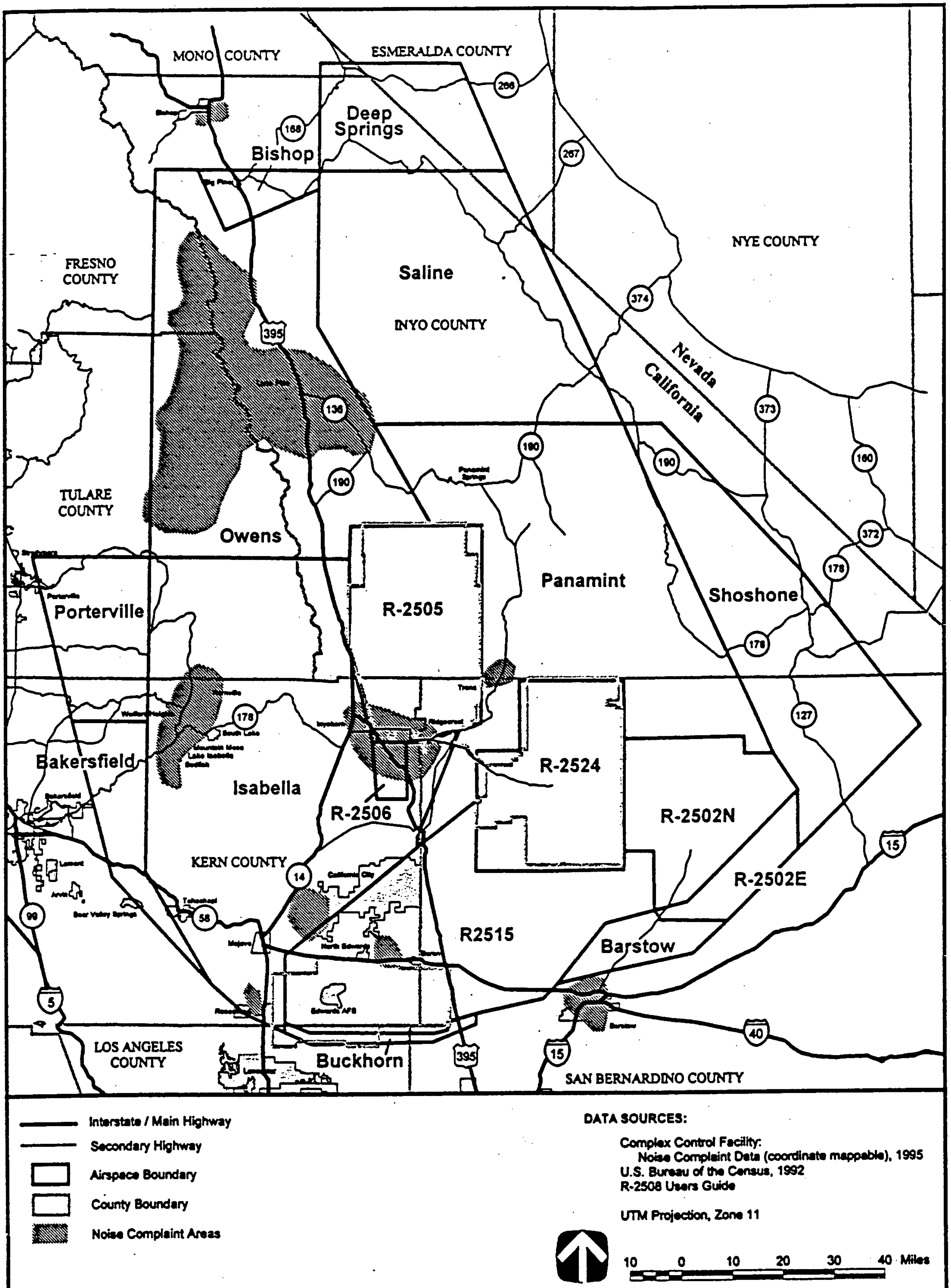

Figure 3.1.3-3 Distribution of Noise Complaints

3.1.3.3 Subsonic Noise Levels Within the R-2508 Complex

The relationship between these noise exposure metrics (L_{dn} and L_{cdn}) and the percent of people expected to be highly annoyed is illustrated in Figure 3.1.3-4. This figure shows the percentage of people that would be expected to be "highly annoyed when subjected to a specific level of noise or sonic boom, quantified in L_{dn} or L_{cdn}, as appropriate. This method is used extensively to estimate the number of people in each exposed area that would be expected to be in a "highly annoyed" category. This consistent method of evaluating human reaction by means of "highly annoyed populations" has a uniformity of usage in almost all government-developed documentation and can, when necessary, be cross-referenced to other human reactions, such as complaints.

MR_NMAP (MOA Range NOISEMAP) is the noise model which was used in determining exposures associated with subsonic aircraft noise resulting from aircraft activities in the R-2508 airspace. MR_NMAP is a general-purpose, PC-based program that calculates noise levels under MOAs, military training routes (MTRs) and Ranges. The MR_NMAP program is functionally a collection of "building block" noise models assembled to model the noise environment.

The models contained in MR_NMAP together are representative of the way aircraft fly in military airspace. There are three general representations: broadly distributed operations that generally occur in MOAs and ranges, distributed parallel tracks that occur along MTRs, and specific tracks that occur in target areas.

The MR_NMAP model was used to estimate noise levels from subsonic flight in the Isabella, Owens, Panamint, Saline, Buckhorn, Shoshone and Barstow Areas and in the R-2515 restricted airspace. Typical mission scenarios were developed, including low-level training; combat maneuvering training; research, development, test and evaluation activities; and refueling operations. Types of aircraft included B-52, F-16, F-15 A-37, KC-135, F-4, F-18, C-141, AV-8, A-4, A-6, and B-1. Avoidance areas in each of the airspaces were also included in the modeling. Avoidance areas included towns, national parks, and airports. Flights over these areas are restricted below a certain altitude. Generally these flight restrictions are 3,000 feet AGL and lateral distance of 3,000 feet. These are discussed in more detail in Chapter 2.0. Maximum SEL for several of the aircraft typically flown in the R-2508 Complex were also generated. This information is included in Appendix D.

Sensitive Noise Receptors with the R-2508 Complex. Sensitive noise receptors for the R-2508 Complex are shown in Figure 3.1.3-5. This information is summarized from the land use section and includes the following kinds of receptors:

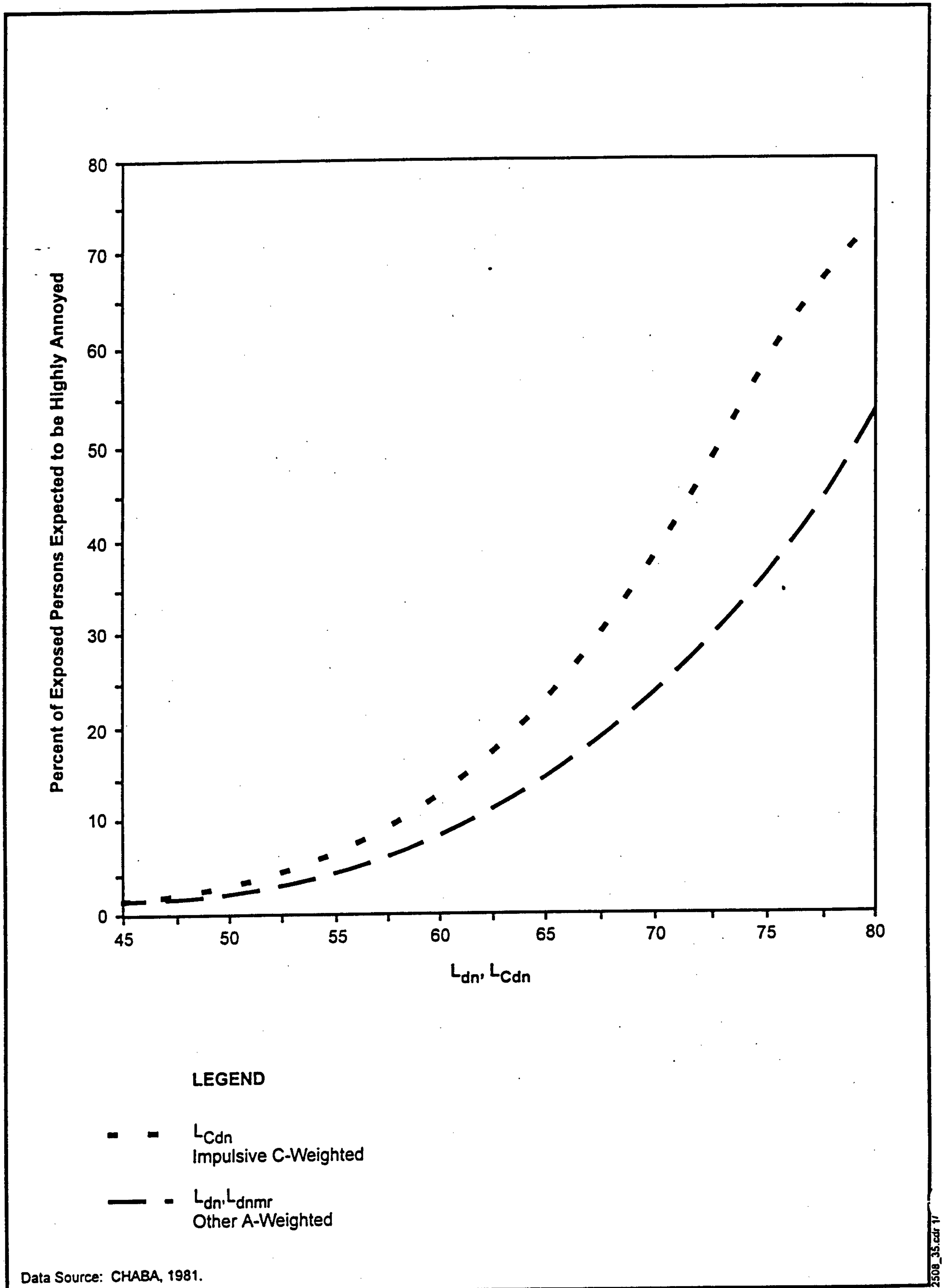

Figure 3.1.3-4 Recommended Relationship for Predicting Response to Noise

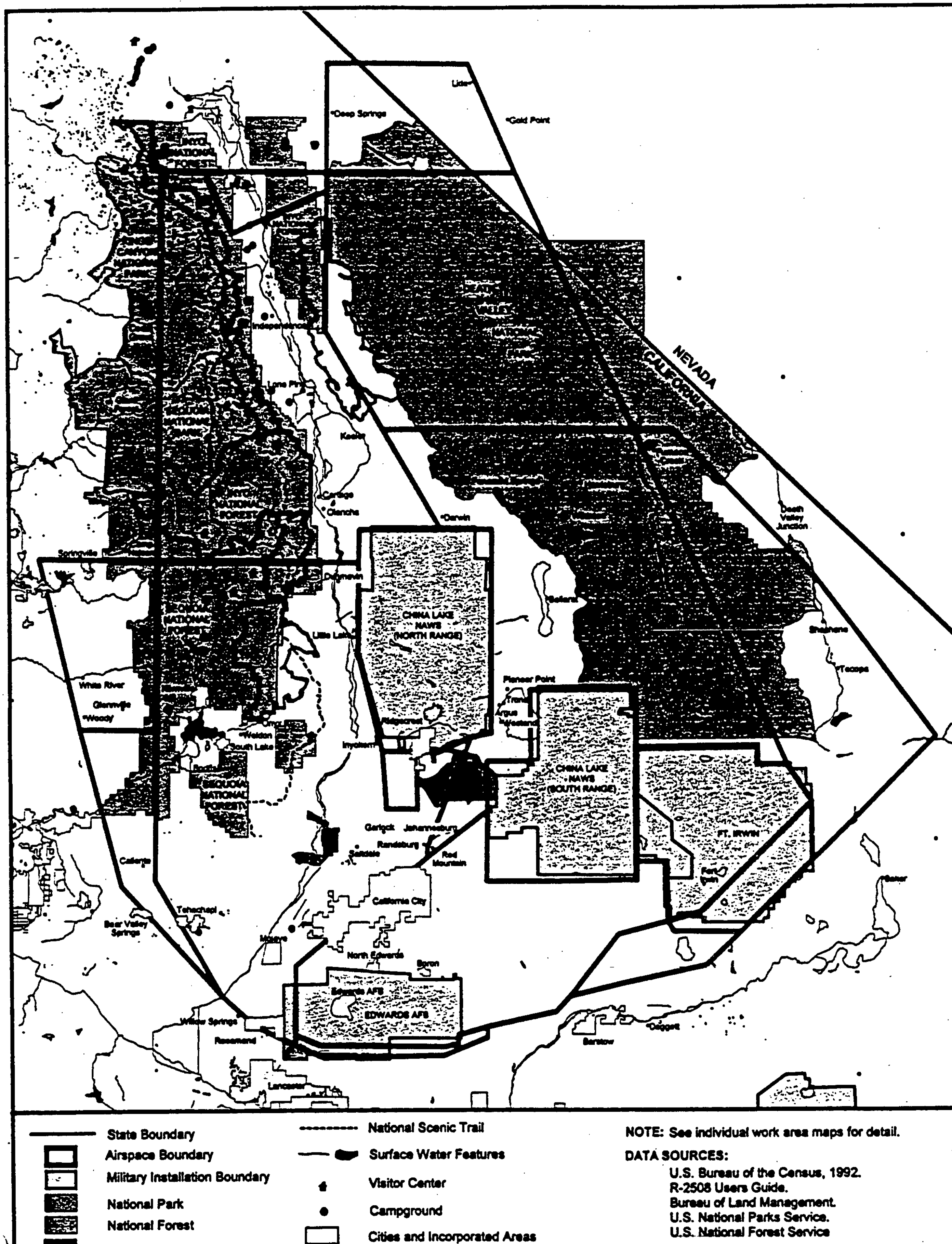

Figure 3.1.3-5 Sensitive Noise Receptor Areas in the R-2508 Complex

- National and state parks, national forests and recreational areas; and

- Cities and incorporated areas, including schools, hospitals and residential areas.

See the Land Use (Section 3.1.1) and Socioeconomic (Section 3.1.2) sections for more detailed information on these subjects.